K-rail

DETAILED PROJECT REPORT

VOLUME III - TRAFFIC SURVEY

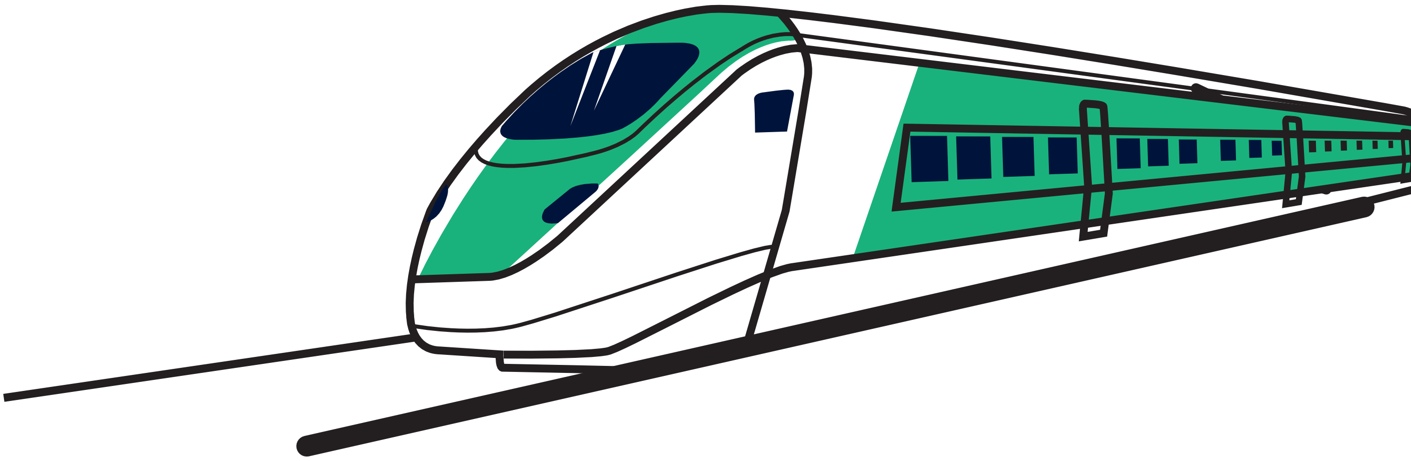
SEMI HIGH SPEED RAIL CORRIDOR
THIRUVANANTHAPURAM TO KASARAGOD

KERALA RAIL DEVELOPMENT CORPORATION LTD

DETAILED PROJECT REPORT

VOLUME III - TRAFFIC SURVEY

SEMI HIGH SPEED RAIL CORRIDOR
THIRUVANANTHAPURAM TO KASARAGOD



DETAILED PROJECT REPORT – (VOLUME III: PART A)

DETAILED PROJECT REPORT FOR SILVERLINE (SEMI HIGH SPEED RAIL) FROM THIRUVANANTHAPURAM TO KASARAGOD

IDENTIFICATION TABLE	
Client/Project owner	Kerala Rail Development Corporation Limited (K-RAIL)
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VOLUME III: PART 3A

III. MAIN RESULTS OF TRAFFIC ANALYSIS AND SECONDARY DATA

iii.1 INTRODUCTION

The aim of this report is to bring out the details of the traffic surveys conducted for this project. Three sets of data was collected as part of traffic and transportation surveys:-

- Reconnaissance survey done along the project corridor helped in understanding general characteristics of the traffic along the corridor. It helped in identifying survey locations, and provided valuable insight during analysis.
- Secondary data such as railway reserved passenger data, bus trips, toll traffic, fuel sales, railway goods traffic etc., were collected .
- Primary traffic surveys are conducted at pre-planned locations to identify existing demand on transportation systems and characteristics of existing traffic. The following type of traffic surveys were conducted:-
  - Classified Traffic Volume Count (TVC) through Videography
  - Vehicle Occupancy Surveys
  - Origin and Destination (OD) surveys for Passenger and Goods vehicles
  - Survey of Truck Operators, Cargo Forwarding Agencies and Railway Parcel Services
  - Passenger Terminal OD Survey at identified Airport, Bus and Train Terminals
  - Stated Preference/Willingness to Pay (WTP) Survey.
  - Apart from the above, additional traffic surveys such as tourist survey, surveys for operating aggregator train services, restaurant cars and sleeper trains at 27 stations, 3 major tourist regions of Kerala, and at 5 major railways stations were also conducted.

In this volume, the data and analysis from primary traffic surveys, secondary data mentioned in the main report Volume II: Part A – Chapter 4 is provided. In Volume II: Part A-Chapter 4, summary of detailed analysis is provided and in Volume III, details and results from Modal shift analysis along with figures and graphs are also provided.

This volume is divided into three parts:

1) Volume III Part 3A: Main Results of Traffic Analysis And Secondary Data: In this section, details of the traffic analysis and details of stated preference survey analysis results are provided.
2) Volume III Part 3B: Main Results of Primary Traffic Surveys: In this part, results of the main traffic surveys conducted during September and October 2019 are provided. The data shown may vary slightly from Chapter 4 as in Volume II – Part A, as the analysis are carried out using various parameters and logical samples as per standard practice and in this section (Volume III part 3B), the analysis is direct representation of field data including all samples.

3) Volume III Part 3C: Main Results of Additional Primary Surveys: In this section, results from the traffic analysis of the additional surveys conducted during December 2019 and January 2020 is provided.

iii.2 ANNEXURES

iii.2.1 Annexure-I: Toll plaza data

Table iii-1: Paliyekkara Toll plaza

Paliyekkara Toll plaza- GURUVAYOOR INFRASTRUCUTURE PRIVATE LIMITED						
Thrissur - Edapally on NH 544 (Old NH-47) (Ch:270/000 to Km 342/000)						
Traffic Data						
MONTH	**LMV (No's)**	**LCV (No's)**	**TRUCK (No's)**	**BUS (No's)**	**MAV (No's)**	**TOTAL (No's)**
Apr-16	930,412	108,979	57,658	73,056	82,959	1,253,064
May-16	966,330	114,491	56,684	73,853	83,053	1,294,411
Jun-16	787,118	97,781	55,932	69,715	80,453	1,090,999
Jul-16	888,585	100,458	55,093	73,353	80,597	1,198,086
Aug-16	893,108	110,758	59,360	76,723	89,964	1,229,913
Sep-16	897,499	104,219	51,684	69,225	76,330	1,198,957
Oct-16	917,276	114,998	54,754	72,993	81,147	1,241,168
Nov-16	249,015	32,655	14,475	23,101	24,243	343,489
Dec-16	908,784	108,135	50,205	79,310	76,284	1,222,718
Jan-17	1,010,008	118,480	54,001	78,586	79,695	1,340,770
Feb-17	819,438	98,660	53,686	66,688	78,707	1,117,179
Mar-17	866,268	105,966	59,950	73,629	88,975	1,194,788
TOTAL TRAFFIC FY 2016-2017	**10,133,841**	**1,215,580**	**623,482**	**830,232**	**922,407**	**13,725,542**
Apr-17	1,015,883	118,230	54,097	68,834	79,705	1,336,749
May-17	1,020,162	119,494	57,560	73,505	86,381	1,357,102
Jun-17	913,012	93,915	49,827	69,368	78,468	1,204,590

Paliyekkara Toll plaza- GURUVAYOOR INFRASTRUCUTURE PRIVATE LIMITED

Thrissur - Edapally on NH 544 (Old NH-47) (Ch:270/000 to Km 342/000)

Traffic Data

MONTH	LMV (No's)	LCV (No's)	TRUCK (No's)	BUS (No's)	MAV (No's)	TOTAL (No's)
Jul-17	969,293	95,090	51,380	71,735	77,046	1,264,544
Aug-17	997,961	113,780	60,386	70,374	89,661	1,332,162
Sep-17	851,463	103,036	50,522	69,834	78,346	1,153,201
Oct-17	795,680	106,487	50,941	77,544	78,955	1,109,607
Nov-17	785,630	108,714	51,648	79,225	83,755	1,108,972
Dec-17	872,592	117,779	55,628	90,913	93,999	1,230,911
Jan-18	1,038,389	120,322	55,615	98,180	94,638	1,407,144
Feb-18	877,879	102,537	51,172	79,854	87,660	1,199,102
Mar-18	955,305	119,270	58,977	83,519	104,476	1,321,547
TOTAL TRAFFIC FY 2017-2018	**11,093,249**	**1,318,654**	**647,753**	**932,885**	**1,033,090**	**15,025,631**
Apr-18	1,093,630	113,381	52,715	79,022	92,833	1,431,581
May-18	1,142,128	118,623	55,998	82,313	97,812	1,496,874
Jun-18	960,080	91,703	50,079	69,990	88,582	1,260,434
Jul-18	998,211	95,387	49,349	71,760	81,163	1,295,870
Aug-18	484,657	55,410	32,189	34,424	57,558	664,238
Sep-18	757,943	110,974	57,631	61,527	100,045	1,088,120
Oct-18	864,704	116,623	55,912	61,090	97,203	1,195,532
Nov-18	878,694	112,980	54,452	66,920	94,327	1,207,373
Dec-18	1,026,943	124,595	57,049	72,104	102,062	1,382,753
Jan-19	971,099	122,942	57,168	62,720	97,111	1,311,040

Paliyekkara Toll plaza- GURUVAYOOR INFRASTRUCUTURE PRIVATE LIMITED

Thrissur - Edapally on NH 544 (Old NH-47) (Ch:270/000 to Km 342/000)

Traffic Data

MONTH	LMV (No's)	LCV (No's)	TRUCK (No's)	BUS (No's)	MAV (No's)	TOTAL (No's)
Feb-19	800,989	106,536	52,073	57,870	88,230	1,105,698
Mar-19	964,827	135,680	57,424	81,102	106,113	1,345,146
TOTAL TRAFFIC FY 2018-2019	**10,943,906**	**1,304,834**	**632,039**	**800,842**	**1,103,039**	**14,784,660**
FY 16-17 Avg / Month	**844,487**	**101,298**	**51,957**	**69,186**	**76,867**	**1,143,795**
FY 17-18 Avg / Month	**924,437**	**109,888**	**53,979**	**77,740**	**86,091**	**1,252,136**
FY 18-19 Avg / Month	**911,992**	**108,736**	**52,670**	**66,737**	**91,920**	**1,232,055**

Table iii-2: Kumbalam Toll plaza

Edapally -Vytilla - Aroor section of NH -66 Stretch

Traffic data at Kumbalam Toll plaza.

Month	Car	LCV	BUS	Truck	3Axle	4-6 Axle HCM/EME/MAV	Oversized	Total Vehicles
	No. of vehicle passed							
17-Jan	409121	53822	46915		17487	11976	14	539335
17-Feb	329237	48608	42474		16665	12193	13	449190
17-Mar	346347	56464	46714		20155	14000	13	483693
17-Apr	398992	55023	27246	18048	18055	12428	70	529862
17-May	434265	59951	18445	30261	19591	14017	9	576539

Edapally -Vytilla - Aroor section of NH -66 Stretch

Traffic data at Kumbalam Toll plaza.

Month	Car	LCV	BUS	Truck	3Axle	4-6 Axle HCM/EME/MAV	Oversized	Total Vehicles
	No. of vehicle passed							
17-Jun	352123	47903	11740	26109	16196	12922	4	466997
17-Jul	379636	49904	11546	29022	16234	13265	3	499610
17-Aug	416558	61251	13339	33994	18787	15788	11	559728
17-Sep	416565	48269	14357	26920	15593	13292	7	535003
17-Oct	364716	52418	15489	30068	16475	14011	0	493177
17-Nov	364605	53642	15885	31463	17151	14445	4	497195
17-Dec	438615	55336	16408	30118	16691	14056	1	571225
18-Jan	411544	56452	16280	31395	17411	13323	4	546409
18-Feb	330575	49499	13240	28517	16829	12377	2	451039
18-Mar	353047	54668	13206	31346	20297	14377	9	486950
18-Apr	393790	54071	15832	28950	18525	12781	7	523956
18-May	417548	57739	17726	29446	18219	14084	3	554765
18-Jun	320870	45608	11201	25199	14978	12756	2	430614
18-Jul	328453	46536	11520	23926	14091	12748	0	437274
18-Aug	173516	27704	5987	14801	8339	8144	2	238493
18-Sep	314984	52521	12814	29790	16566	15089	4	441768
18-Oct	312144	49313	13075	31957	16840	15070	3	438402
18-Nov	329119	49224	14823	31052	16786	14520	0	455524
18-Dec	409288	52457	15974	31672	17377	14796	0	541564
19-Jan	381540	51817	12672	32280	17254	14594	1	510158
19-Feb	341522	49132	12230	29731	15891	13790	0	462296
19-Mar	366287	53035	12480	33156	19958	15374	1	500291

Edapally -Vytilla - Aroor section of NH -66 Stretch								
Traffic data at Kumbalam Toll plaza.								
Month	Car	LCV	BUS	Truck	3Axle	4-6 Axle HCM/EME/MAV	Oversized	Total Vehicles
	No. of vehicle passed							
19-Apr	413127	50893	14019	29877	16052	13428	3	537399
19-May	439471	57408	15211	32531	16686	14233	0	575540
19-Jun	391413	46886	10297	28305	14529	12956	5	504391
19-Jul	384923	48452	11030	30472	14707	13593	0	503177
19-Aug	365013	46867	10349	29297	14138	13928	3	479595
19-Sep	390312	41737	10961	26693	12799	12033	3	494538
19-Oct	357966	45004	11955	29773	14107	13053	0	471858

iii.2.2 Annexure-II: Monthly Statement, Trivandrum Central

Table iii-3: MONTHLY COLLECTION STATEMENT- Trivandrum Central, KSRTC

MONTHLY COLLECTION STATEMENT- Trivandrum Central, KSRTC										
01.10.2019 TO 31.10.2019										
Schd No	**Schd Count**	**Schd Time**	**Route**	**Service Type**	**Schd KM**	**Optd KM**	**Tot Coll.**	**Tot Psngr**	**EPKM**	**EPB**
1	28	15:15	TVM BANGALORE	SCANIA	45836	45801	2293973	3625	50.09	81928
3	29	19:30	TVM KOZHIKKODE	SDLX	25172	25174	848555	4602	33.71	29261
5	31	13:30	TVM SULTHANBATHERY	SEXP	32922	32674	1085932	7161	33.24	35030
29	30	5:30	TVM CAPE	SFP	15540	14429	452125	12786	31.33	15071
32	31	4:40	TVM THENKASI	FP	15252	15252	606856	15829	39.79	19576
33	30	6:55	TVM THENKASI	FP	14760	14520	573064	14425	39.47	19102
34	31	8:00	TVM THENKASI	FP	15252	15099	549782	16095	36.41	17735
35	31	9:00	TVM THENKASI	FP	15252	15252	624162	17274	40.92	20134
36	30	10:40	TVM THENKASI	FP	14760	14760	647425	15949	43.86	21581

MONTHLY COLLECTION STATEMENT- Trivandrum Central, KSRTC

01.10.2019 TO 31.10.2019

Schd No	Schd Count	Schd Time	Route	Service Type	Schd KM	Optd KM	Tot Coll.	Tot Psngr	EPKM	EPB
37	31	12:10	TVM THENKASI	FP	15252	15770	622480	16160	39.47	20080
AD46	26	8:35	TVM KOWAYAM	FP	15808	13982	445809	13041	31.89	17147
40	30	7:30	TVM NEDUMKANDAM	FP	16710	16328	634125	13158	38.84	21138
42	26	8:15	TVM ERUMELY	FP	15392	13638	520365	12056	38.15	20014
43	27	14:00	TVM NEDUMKANDAM	FP	14148	14114	511613	12859	36.25	18949
47	31	8:00	TVM PAMBA	FP	11284	11648	490504	13064	42.11	15823
48	31	2:30	TVM KANYAKUMARI	SFP	16058	15152	472288	14179	31.17	15235
73	31	6:20	TVM KANYA KUMARI	SFP	16058	15422	499246	11947	32.37	16105
75	31	17:00	TVM BANGALORE	SCANIA	49848	49851	2795075	4938	56.07	90164
79	31	15:40	TVM KMLY	SFP	14477	14472	548913	11976	37.93	17707
101	26	21:15	TVM PALAKKAD	SFP	19292	18183	687819	11345	37.83	26455
102	30	21:45	TVM NEDUMKANDAM	SFP	17730	17372	642322	11465	36.98	21411
104	21	2:45	TVM THRISSUR	SFP	12705	12312	565557	8731	45.93	26931
105	25	3:45	TVM THRISSUR	SFP	15125	14593	689617	10082	47.26	27585
106	23	11:15	TVM THRISSUR	SFP	13915	13614	490372	10491	36.02	21321
107	30	14:30	TVM PALANI	SFP	29460	29465	1326978	17596	45.04	44233
108	28	7:00	TVM COIMBATORE	SFP	23912	23915	1256110	15233	52.52	44861
109	30	9:00	TVM COIMBATORE	SFP	25620	24986	1184089	18251	47.39	39470
110	29	4:30	TVM COIMBATORE	SFP	24766	24768	1112326	15117	44.91	38356
111	31	17:00	TVM COIMBATORE	SFP	26474	27115	1341338	18727	49.47	43269
112	31	19:00	TVM COIMBATORE	SFP	26474	26223	1114775	13744	42.51	35960
113	31	23:30	TVM COIMBATORE	SFP	26474	26477	1145636	11920	43.27	36956
115	30	11:00	TVM KOZHIKODE	SFP	25590	25591	1065060	17919	41.62	35502

MONTHLY COLLECTION STATEMENT- Trivandrum Central, KSRTC										
01.10.2019 TO 31.10.2019										
Schd No	**Schd Count**	**Schd Time**	**Route**	**Service Type**	**Schd KM**	**Optd KM**	**Tot Coll.**	**Tot Psngr**	**EPKM**	**EPB**
116	29	15:30	TVM VAZHIKKADAVU	SFP	24911	25155	1084850	16842	43.13	37409
118	28	6:15	TVM PALAKKAD	SFP	20216	20748	897594	15278	43.26	32057
119	31	20:15	TVM PALAKKAD	SFP	22072	22072	808837	14971	36.65	26092
120	28	12:00	TVM THIRUVILWAMAL	SFP	19628	19190	895607	14589	46.67	31986
121	27	13:45	TVM PENGAMUKKU	SFP	18171	18337	975033	15851	53.17	36112
122	29	22:30	TVM MATTUPETTY	SFP	18270	18293	789335	12879	43.15	27218
123	31	13:00	TVM MUNNAR	SFP	18662	19242	749942	12840	38.97	24192
124	31	23:30	TVM KAITAPANA	SFP	19065	19060	815816	11683	42.80	26317
125	19	8:00	TVM THRISSUR	SFP	11495	11359	397979	8207	35.04	20946
127	27	16:15	TVM KOZHIKODE	SFP	21222	21220	831326	12948	39.18	30790
128	17	6:00	TVM THRISSUR	SFP	10285	9970	495111	7438	49.66	29124
129	25	1:30	TVM THRISSUR	SFP	15125	14572	585973	10405	40.21	23439
130	28	1:30	TVM KOZHIKODE	SFP	23884	23916	919191	13676	38.43	32828
131	15	4:15	TVM THRISSUR	SFP	9075	8500	390925	6497	45.99	26062
132	31	14:00	TVM COIMBATORE	SFP	11956	23030	1054593	14913	45.79	34019
133	31	7:30	TVM PALAKKAD	SFP	22072	22241	935723	16279	42.07	30185
200	30	4:00	TRIVANDRUM CBE	SCANIA	25620	24842	1296420	4654	52.19	43214
201	21	18:00	TVM MGPM	SCANIA	28623	27331	1338461	3146	48.97	63736
202	14	20:00	TVM MYSR	SCANIA	18144	18144	1090775	1902	60.12	77913
203	22	8:00	TVM CBE	SCANIA	18788	18789	795774	2502	42.35	36172
205	31	21:00	TVM COIMBATORE	SCANIA	26474	26477	1551042	4077	58.58	50031
207	31	16:00	TVM MOOKAMBIKA	SCANIA	50623	49415	2666427	4676	53.96	86014
208	24	21:30	TVM KANNUR	SCANIA	25320	25302	1433217	3003	56.65	59717
209	31	14:00	BGLR	SCANIA	49848	49581	2994413	5441	60.39	96594
211	30	19:45	TVM NILAMBUR	SDLX	24270	24275	782323	4680	32.23	26077

MONTHLY COLLECTION STATEMENT- Trivandrum Central, KSRTC

01.10.2019 TO 31.10.2019

Schd No	Schd Count	Schd Time	Route	Service Type	Schd KM	Optd KM	Tot Coll.	Tot Psngr	EPKM	EPB
212	31	22:00	TVM PLKD	SDLX	22072	22086	738414	5564	33.43	23820
213	31	22:20	TVM KKD	SDLX	26908	26655	950422	5456	35.66	30659
214	26	19:00	TVM MYSR	SCANIA	32838	31895	1893122	3621	59.35	72812
215	31	22:45	TVM PALAKKAD	MINNA	22072	22075	767730	3606	34.78	24765
217	12	19:30	TVM BANGALORE	SCANIA	19296	19295	1033029	1805	53.54	86086
218	13	13:45	TVM BANGALORE	SCANIA	20891	20917	1021406	1288	48.83	78570
AD37	30	5:55	TVM THENKASI	FP	14760	14627	471291	11862	32.22	15710
AD39	29	13:00	TVM THENKASI	FP	14760	14271	479606	13195	33.61	16538
AD51	31	23:45	TVM KOZHIKODE	MINNA	26908	27574	1033172	4769	37.47	33328
AD52	3	16:30	TVM KOZHIKKODE	SDLX	2604	3023	85702	1414	28.35	28567
ADL	14	13:00	TVM PALANI	SFP	11900	11896	339998	7647	28.58	24286
AD35	6	18:30	TVM THRISSUR	SFP	590	3408	126052	2310	36.99	21009
ADD	42	18:15	ADDITIONAL SERVICES		23479	20071	835895	13487	41.65	19902
Total	1891				1460215	1456806	64196817	727146	44.07	33949

iii.2.3 Annexure-III: Traffic Analysis Zone (TAZ)

Table iii-4: Traffic Analysis Zone

Zone No.	Zone Name	District	State/UT
1	Manjeshwar	Kasaragod	Kerala
2	Kasaragod (Town)	Kasaragod	
3	Uduma	Kasaragod	
4	Kanhangad	Kasaragod	

Zone No.	Zone Name	District	State/UT
5	Trikaripur	Kasaragod	
6	Payyanur	Kannur	
7	Kasargod (Rest of Dist.)	Kasaragod	
8	Taliparamba	Kannur	
9	Kalliasseri	Kannur	
10	Azhikode	Kannur	
11	Kannur (City)	Kannur	
12	Thottada	Kannur	
13	Edakkad	Kannur	
14	Dharmadam	Kannur	
15	Thalassery	Kannur	
16	Kadirur	Kannur	
17	Kuthuparamba	Kannur	
18	Kannur International Airport/Mattannur	Kannur	
19	Iritty	Kannur	
20	Peravoor	Kannur	
21	Kannur (Rest of Dist.)	Kannur	
22	Mahe	Mahe	Puducherry
23	Nadapuram	Kozhikode	Kerala
24	Vadakara	Kozhikode	
25	Perambra	Kozhikode	

Zone No.	Zone Name	District	State/UT
26	Quilandy	Kozhikode	
27	Elathur	Kozhikode	
28	Kozhikode(City)	Kozhikode	
29	Beypore	Kozhikode	
30	Thenhipalam	Kozhikode	
31	Thamarassery	Kozhikode	
32	Thiruvambadi	Kozhikode	
33	Kozhikode (Rest of Dist.)	Kozhikode	
34	Kalpetta	Wayanad	
35	Sulthan Bathery	Wayanad	
36	Mananthavady	Wayanad	
37	Wayanad (Rest of Dist.)	Wayanad	
38	Parappanangadi	Malappuram	
39	Tirurangadi	Malappuram	
40	Vengara	Malappuram	
41	Tanur	Malappuram	
42	Kottakkal	Malapuram	
43	Tirur	Malapuram	
44	Thavanur	Malapuram	
45	Kuttipuram	Malapuram	
46	Edappal	Malapuram	

Zone No.	Zone Name	District	State/UT
47	Ponnani	Malapuram	
48	Calicut International Airport/Karipur/ Kondotty	Malapuram	
49	Areekode	Malapuram	
50	Edavanna	Malapuram	
51	Nilambur	Malapuram	
52	Manjeri	Malapuram	
53	Ernad	Malapuram	
54	Malappuram (City)	Malappuram	
55	Mankada	Malappuram	
56	Perinthalmanna	Malappuram	
57	Malappuram (Rest of Dist.)	Malappuram	
58	Thrithala	Palakkad	
59	Pattambi	Palakkad	
60	Shornur	Palakkad	
61	Ottapalam	Palakkad	
62	Vadakkancherry	Palakkad	
63	Palakkad (Rest of Dist.)	Palakkad	
64	Kunnamkulam	Thrissur	
65	Chelakkara	Thrissur	
66	Guruvayoor	Thrissur	
67	Thrissur (City.)	Thrissur	

Zone No.	Zone Name	District	State/UT
68	Ollur	Thrissur	
69	Nattika/ Triparayar	Thrissur	
70	Puthukkad	Thrissur	
71	Kaipamangalam	Thrissur	
72	Irinjalakuda	Thrissur	
73	Chalakudy	Thrissur	
74	Kodungallur	Thrissur	
75	Thrissur (Rest of Dist.)	Thrissur	
76	Cochin International Airport/Angamaly	Ernakulam	
77	North Paravoor	Ernakulam	
78	Aluva	Ernakulam	
79	Kunnathunad	Ernakulam	
80	Kochi	Ernakulam	
81	Thrippunithura	Ernakulam	
82	Perumbavoor	Ernakulam	
83	Kothamangalam	Ernakulam	
84	Muvattupuzha	Ernakulam	
85	Piravom	Ernakulam	
86	Koothattukulam	Ernakulam	
87	Ernakulam (Rest of Dist.)	Ernakulam	
88	Thodupuzha	Idukki	

Zone No.	Zone Name	District	State/UT
89	Idukki (Rest of Dist.)	Idukki	
90	Aroor	Alappuzha	
91	Cherthala	Alappuzha	
92	Mararikulam	Alappuzha	
93	Alappuzha (City)	Alappuzha	
94	Ambalapuzha	Alappuzha	
95	Kuttanad	Alappuzha	
96	Haripad	Alappuzha	
97	Chengannur	Alappuzha	
98	Mavelikkara	Alappuzha	
99	Kayamkulam	Alappuzha	
100	Alappuzha (Rest of Dist.)	Alappuzha	
101	Thalayolaparambu	Kottayam	
102	Vaikom	Kottayam	
103	Kaduthuruthy	Kottayam	
104	Pala	Kottayam	
105	Ettumanoor	Kottayam	
106	Kottayam (City)	Kottayam	
107	Puthuppally	Kottayam	
108	Pampady	Kottayam	
109	Kanjirappally	Kottayam	

Zone No.	Zone Name	District	State/UT
110	Changanassery	Kottayam	
111	Kottayam (Rest of Dist.)	Kottayam	
112	Thiruvalla	Pathanamthitta	
113	Mallappally	Pathanamthitta	
114	Aranmula	Pathanamthitta	
115	Pandalam	Pathanamthitta	
116	Adoor	Pathanamthitta	
117	Ranni	Pathanamthitta	
118	Pathanamthitta (City)	Pathanamthitta	
119	Konni	Pathanamthitta	
120	Chittar	Pathanamthitta	
121	Sabarimala	Pathanamthitta	
122	Gavi	Pathanamthitta	
123	Pathanamthitta (Rest of Dist.)	Pathanamthitta	
124	Karunagappally	Kollam	
125	Chavara	Kollam	
126	Sasthamkotta	Kollam	
127	Kollam (City.)	Kollam	
128	Kundara	Kollam	
129	Kottarakkara	Kollam	
130	Chathannoor	Kollam	

Zone No.	Zone Name	District	State/UT
131	Pathanapuram	Kollam	
132	Punalur	Kollam	
133	Chadayamangalam	Kollam	
134	Parippally	Kollam	
135	Kollam (Rest of Dist.)	Kollam	
136	Varkala	Thiruvananthapuram	
137	Attingal	Thiruvananthapuram	
138	Kilimanoor	Thiruvananthapuram	
139	Vamanapuram	Thiruvananthapuram	
140	Chirayinkeezhu	Thiruvananthapuram	
141	Venjaramoodu	Thiruvananthapuram	
142	Nedumangad	Thiruvananthapuram	
143	Thiruvananthapuram (City)	Thiruvananthapuram	
144	Trivandrum International Airport	Thiruvananthapuram	
145	Aruvikkara	Thiruvananthapuram	
146	Kattakkada	Thiruvananthapuram	
147	Kovalam	Thiruvananthapuram	
148	Neyyattinkara	Thiruvananthapuram	
149	Thiruvananthapuram (Rest of Dist.)	Thiruvananthapuram	
150	Dharmapuri	North TN	Tamil Nadu
151	Tiruvannamalai	North TN	

Zone No.	Zone Name	District	State/UT
152	Vellore	North TN	
153	Kanchipuram	North TN	
154	Chennai	North TN	
155	Ooty	North TN	
156	Coimbatore	North TN	
157	Erode	North TN	
158	Salem	North TN	
159	Pollachi	North TN	
160	Rest of North TN	Tiruvallur,Krishnagiri,Villupuram, Cuddalore, Nilgiris, Tiruppur	
161	Karaikal	Karaikal	Puducherry
162	Karur	North central TN	Tamil Nadu
163	Pudukkotai	North central TN	
164	Thiruchirapalli	North central TN	
165	Thanjavur	North central TN	
166	Kumbakonam	North central TN	
167	Rest of North central TN	Namakkal, Peramballur, Ariyalur, Nagapattinam, Thiruvarur	
168	Theni	South central TN	
169	Madurai	South central TN	
170	Karaikkudi	South central TN	

Zone No.	Zone Name	District	State/UT
171	Madurai	South central TN	
172	Dindigul	South central TN	
173	Palani	South central TN	
174	Sivakasi	South central TN	
175	Rameshwaram	South central TN	
176	Rest of South central TN	Sivaganga, Ramanathapuram, Virudhunagar	
177	Nagercoil	South TN	
178	Thirunelveli	South TN	
179	Thoothukudi	South TN	
180	Rest of South TN	Kanyakumari, Tirunelveli, Thoothukudi	
181	Mangalore	Dakshina Kannada	Karnataka
182	Rest of Coastal Karnataka	Dakshina Kannada, Udupi, Uttar Kannada	
183	Mysore	South Karnataka	
184	Madikeri	South Karnataka	
185	Bengaluru	South Karnataka	
186	Hassan	South Karnataka	
187	Tumakuru	South Karnataka	
188	Chikmagalur	South Karnataka	
189	Shivamogga	South Karnataka	

Zone No.	Zone Name	District	State/UT
190	Davanagere	South Karnataka	
191	Rest of South Karnataka	Chamarajanagar, Chikkaballapur, Chitradurga, Kodagu, Kolar, Mandya,Ramanagara.	
192	Bellari	North Karnataka	
193	Hubli	North Karnataka	
194	Belgaum	North Karnataka	
195	Rest of North Karnataka	Vijayapura, Bagalkot, Bidar, Gulbarga, Yadagiri, Raichur, Gadag, Dharwad, Haveri and Koppal districts.	
196	Rest of India		
200	Outside India		

iii.2.4 Annexure IV- Modal Composition at Sections

Figures below provide how vehicle composition at important survey locations based on AADT (both in terms of total vehicles and total PCUs).

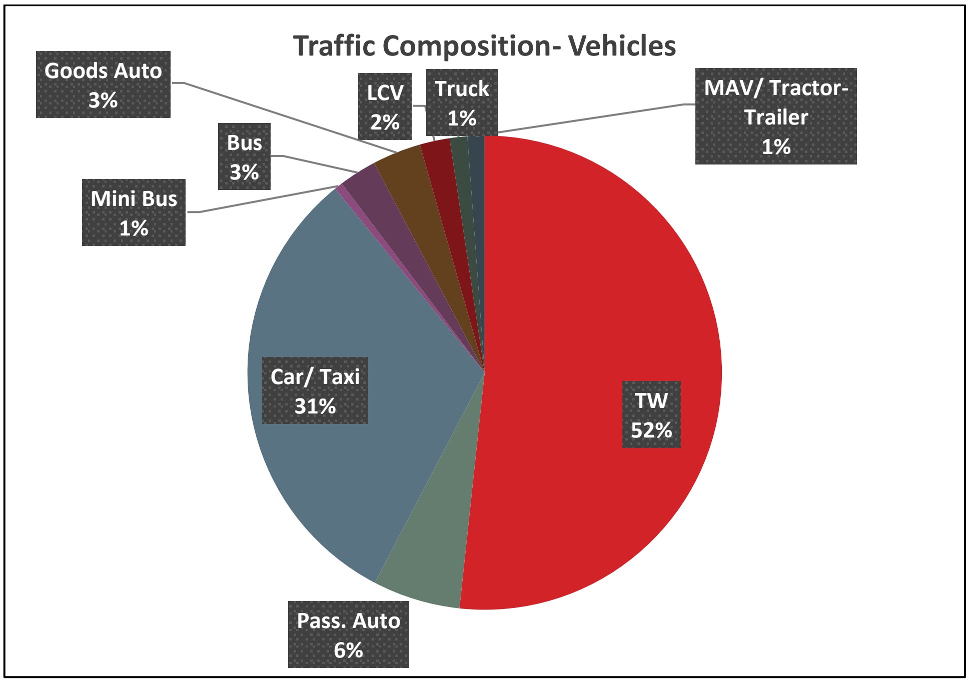

Figure iii-1: Traffic Composition (Vehicles) at Karunagapally

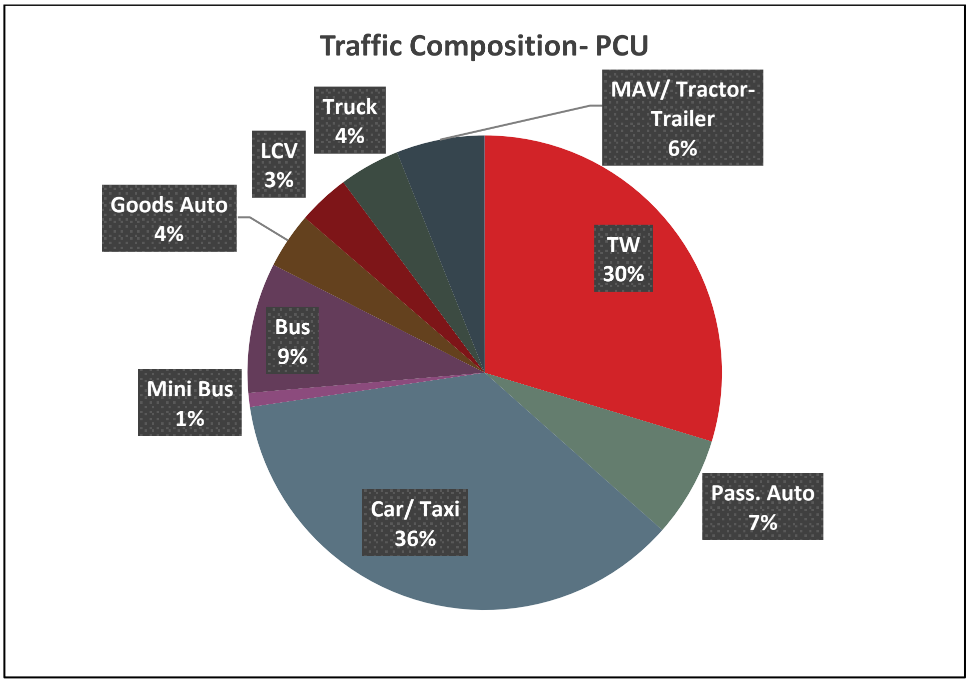

Figure iii-2: Traffic Composition (PCU) at Karunagapally

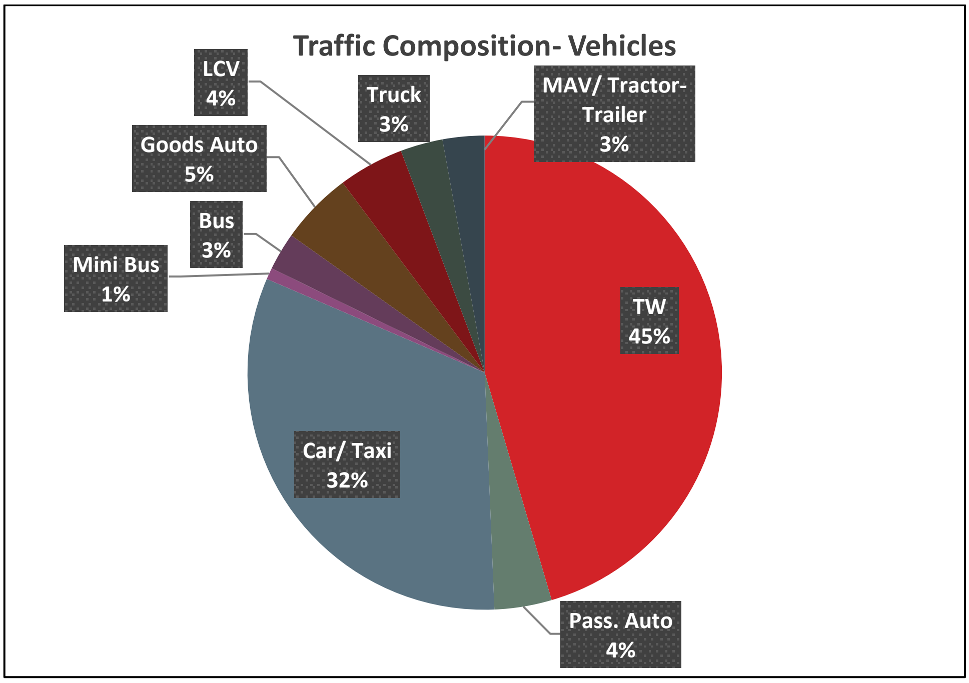

Figure iii-3 Traffic Composition (Vehicles) at Kumbalam

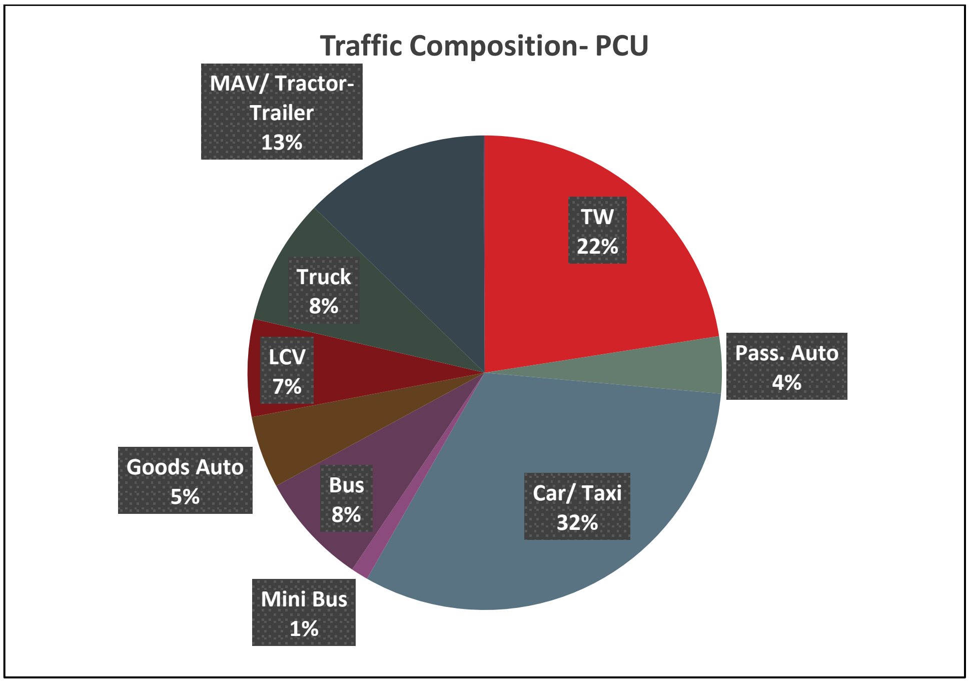

Figure iii-4 Traffic Composition (PCU) at Kumbalam

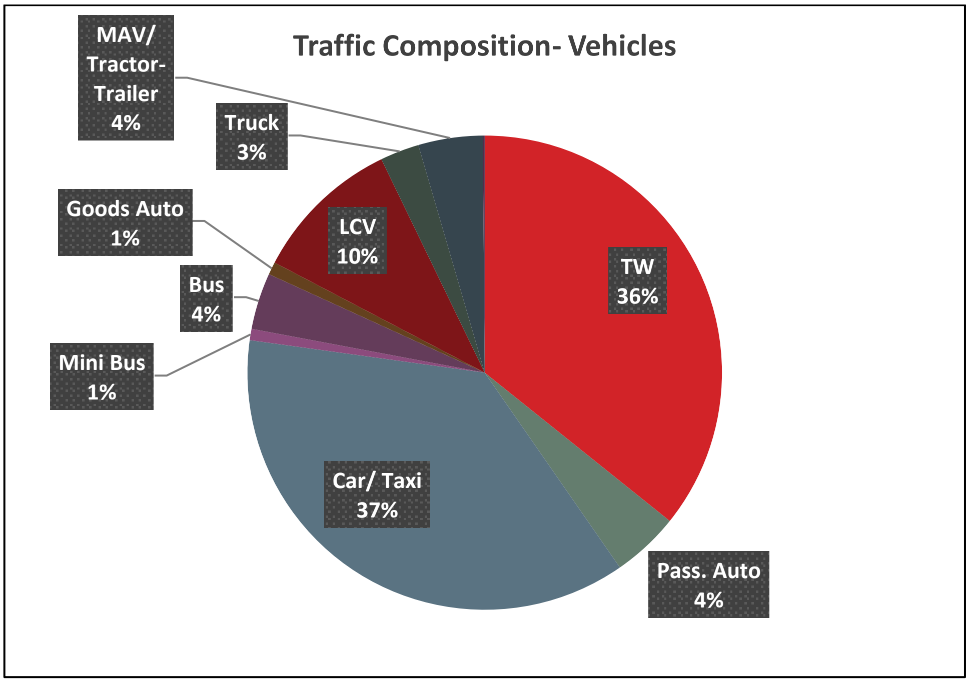

Figure iii-5 Traffic Composition (Vehicles) at Paliyekkara

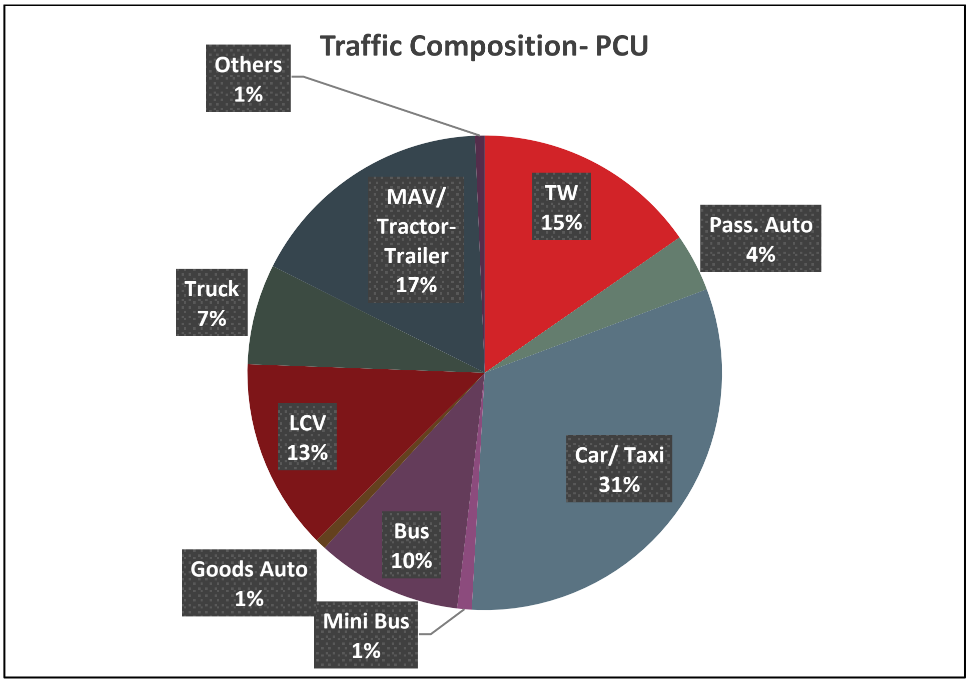

Figure iii-6 Traffic Composition (PCU) at Paliyekkara

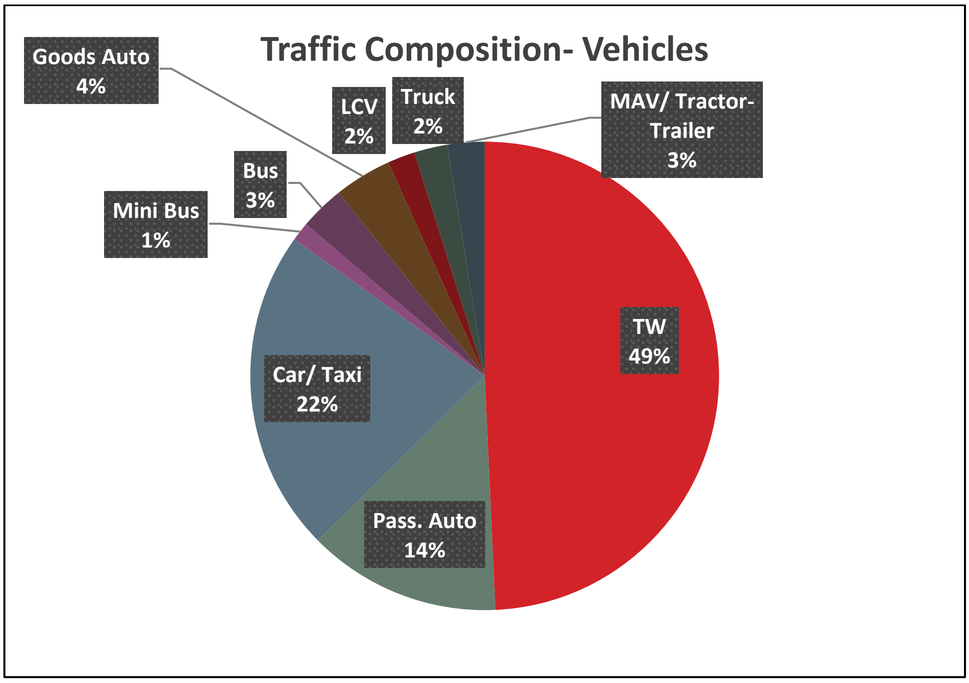

Figure iii-7 Traffic Composition (Vehicles) at Gurupadapuri

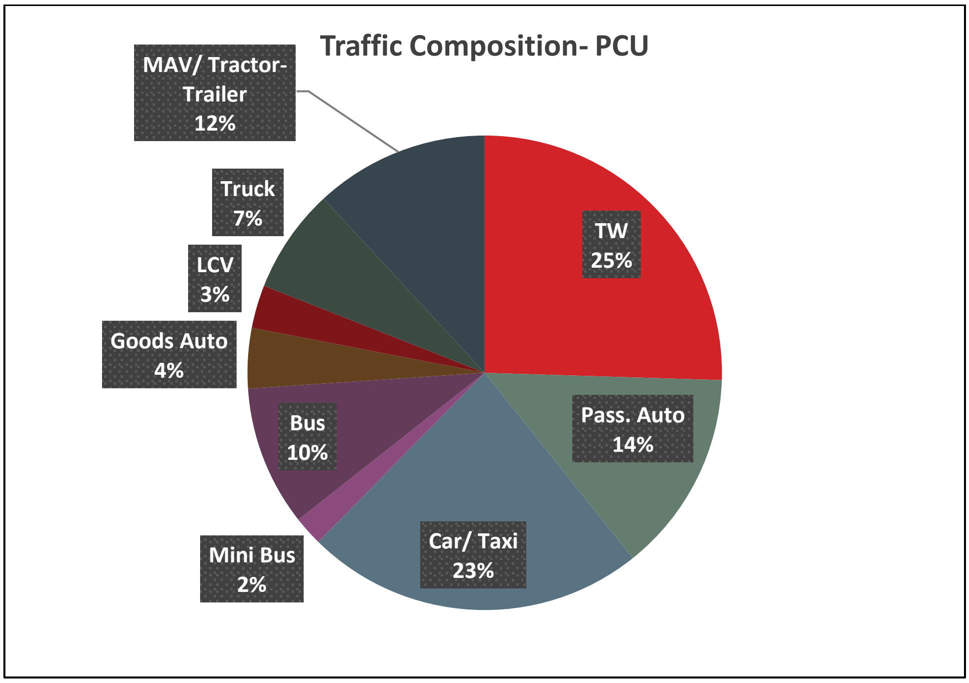

Figure iii-8 Traffic Composition (PCU) at Gurupadapuri

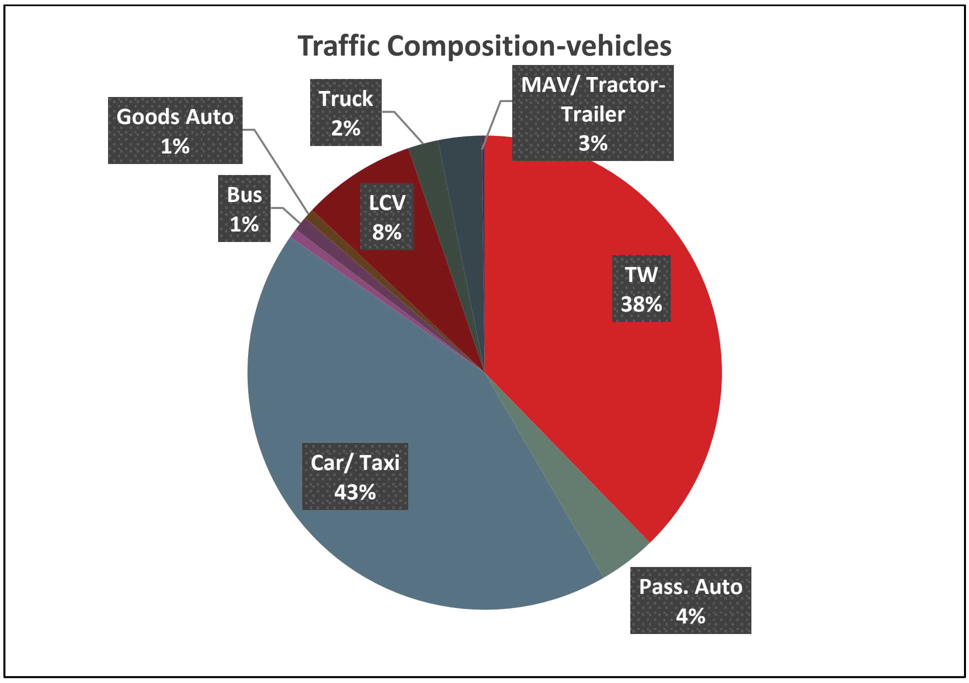

Figure iii-9 Traffic Composition (Vehicle) at Azhinjillam

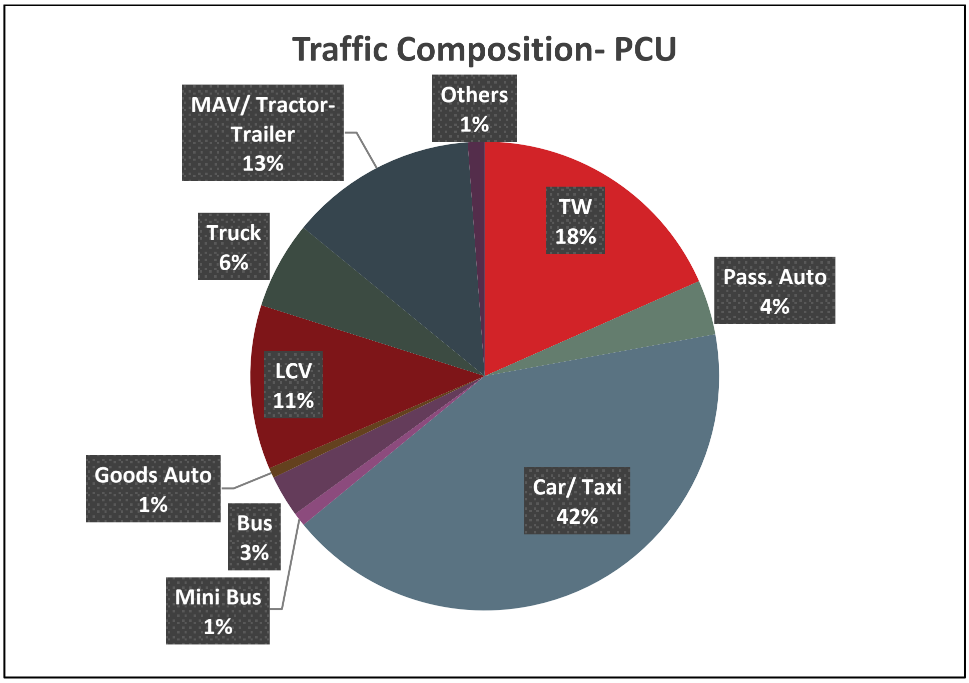

Figure iii-10 Traffic Composition (PCU) at Azhinjillam

iii.2.5 Annexure V: Sectorial Distribution of Gross State Value Added (GSVA)

Sectorial Distribution of Gross State Value Added (GSVA)

2014-15 to 2016-17 at Constant Prices

₹ in lakhs

Sl. No	Industry of Origin	At Constant Price					
		2016-17		2017-18(P)		2018-19 (Q)	
		GSVA	% share	GSVA	% share	GSVA	% share
1.	Agriculture, forestry and fishing	4335472	10.0	4410011	9.5	4387254	8.8
1.10	Crops	2319185	5.3	2328079	5.0	2278950	4.6
1.20	Livestock	1175115	2.7	1196531	2.6	1193330	2.4
1.30	Forestry and logging	435912	1.0	435014	0.9	435083	0.9
1.40	Fishing and aquaculture	405260	0.9	450387	1.0	479890	1.0
2.	Mining and quarrying	258222	0.6	307119	0.7	262290	0.5
	Primary	4593694	10.6	4717130	10.1	4649543	9.3
3.	Manufacturing	5726838	13.2	5936834	12.8	6599315	13.2
4.	Electricity, gas, water supply & other utility services	412109	0.9	524131	1.1	587038	1.2
5.	Construction	6190002	14.2	6438107	13.8	6846911	13.7
	Secondary	12328949	28.3	12899072	27.7	14033264	28.1
6.	Trade, repair, hotels and restaurants	7188899	16.5	8142440	17.5	8711302	17.4
6.10	Trade & repair services	6539724	15.0	7450126	16.0	7983580	16.0
6.20	Hotels & restaurants	649174	1.5	692314	1.5	727722	1.5
7.	Transport, storage, communication & services related to broadcasting	3667976	8.4	3585201	7.7	3548055	7.1
7.10	Railways	142124	0.3	170732	0.4	205097	0.4
7.20	Road transport	2435474	5.6	2325775	5.0	2235811	4.5
7.30	Water transport	25080	0.1	26866	0.1	31335	0.1
7.40	Air transport	107239	0.2	106276	0.2	102163	0.2
7.50	Services incidental to transport	109674	0.3	127824	0.3	151911	0.3
7.60	Storage	4139	0.0	4619	0.0	5443	0.0
7.70	Communication & services related to	844246	1.9	823109	1.8	816295	1.6
8.	Financial services	2176956	5.0	2193637	4.7	2210445	4.4
9.	Real estate, ownership of dwelling & professional services	6888964	15.8	7621135	16.4	8286485	16.6
10.	Public administration	1511526	3.5	1681253	3.6	1928255	3.9
11.	Other services	5180142	11.9	5674407	12.2	6640770	13.3
	Tertiary	26614463	61.1	28898073	62.1	31325312	62.6
12.	TOTAL GSVA at basic prices	43537107	100.0	46514275	100.0	50008120	100.0

P- provisional, Q- Quick Estimate

Source: Department of Economics and Statistics.

iii.2.6 Annexure VI: Daily Variation of Traffic

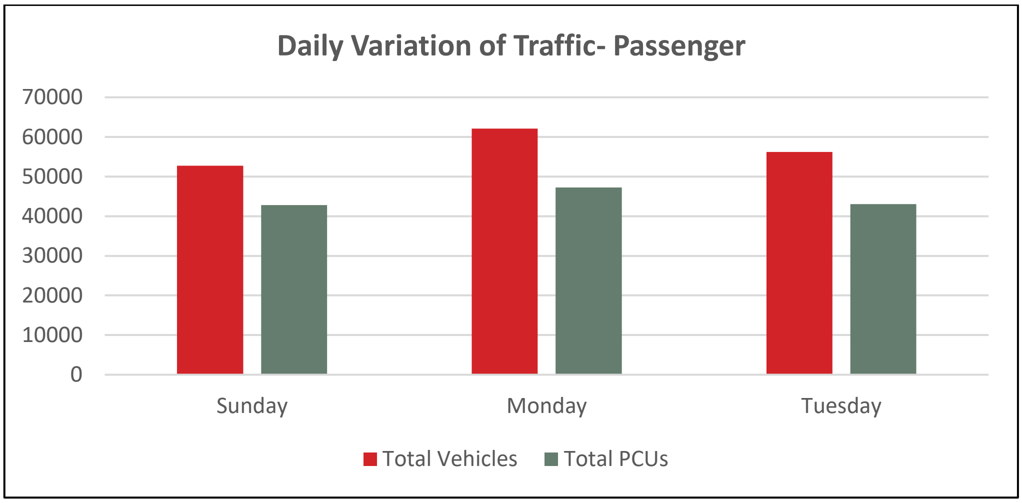

Figure iii-11 Daily Traffic Variation at Karunagapally -Passenger Traffic

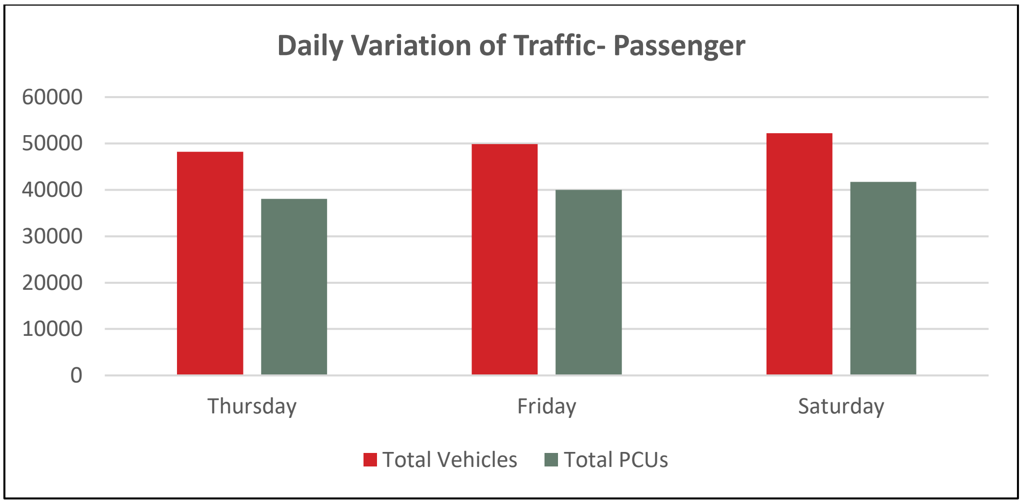

Figure iii-12 Daily Traffic Variation at Kumbalam - Passenger Traffic

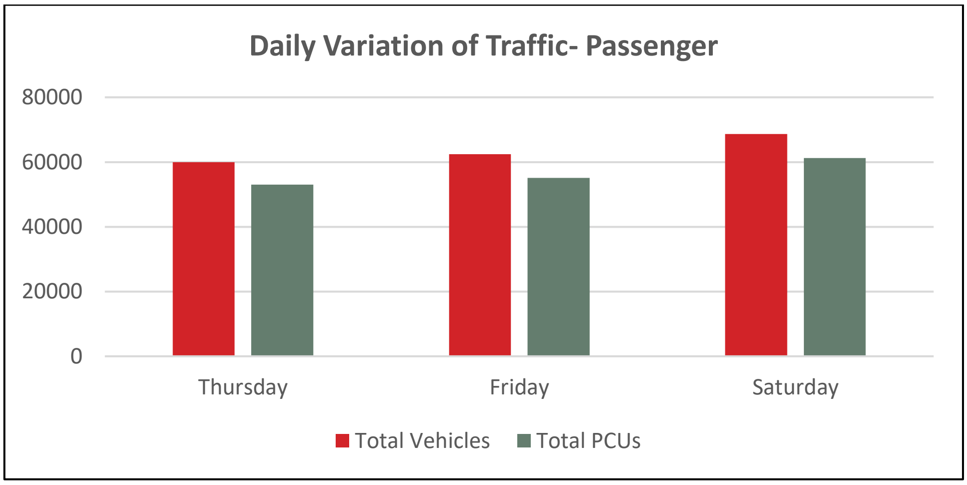

Figure iii-13 Daily Traffic Variation at Paliyekkara- Passenger Traffic

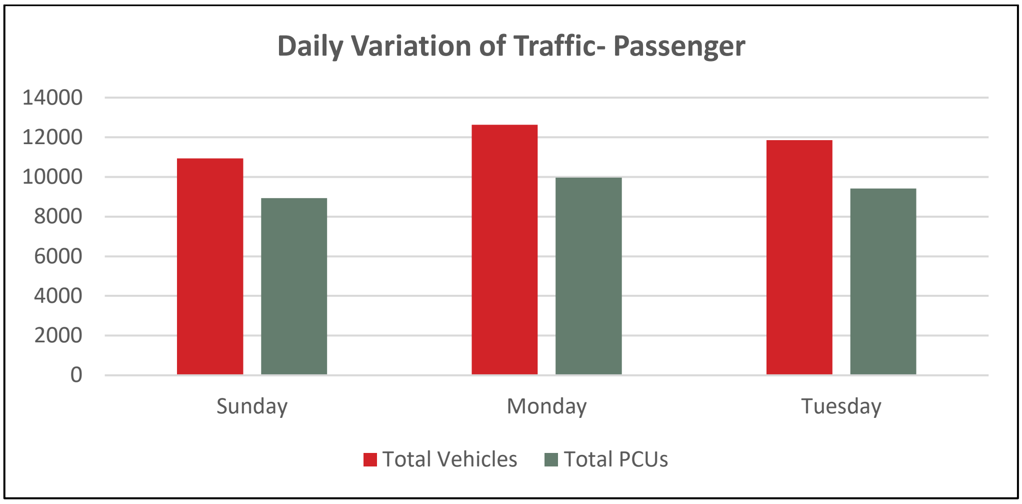

Figure iii-14 Daily Traffic Variation at Gurupadapuri- Passenger Traffic

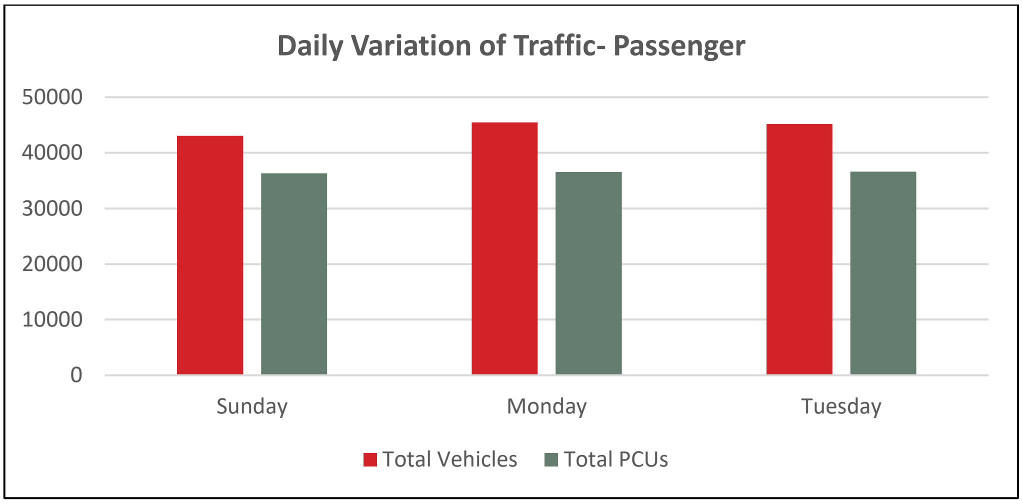

Figure iii-15 Daily Traffic Variation at Azhinjillam- Passenger Traffic

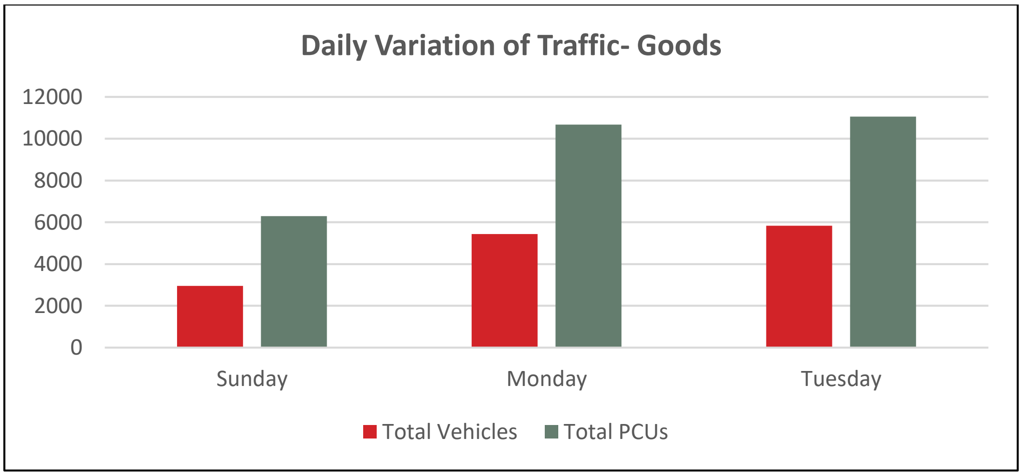

Figure iii-16 Daily Traffic Variation at Karunagapally – Goods Traffic

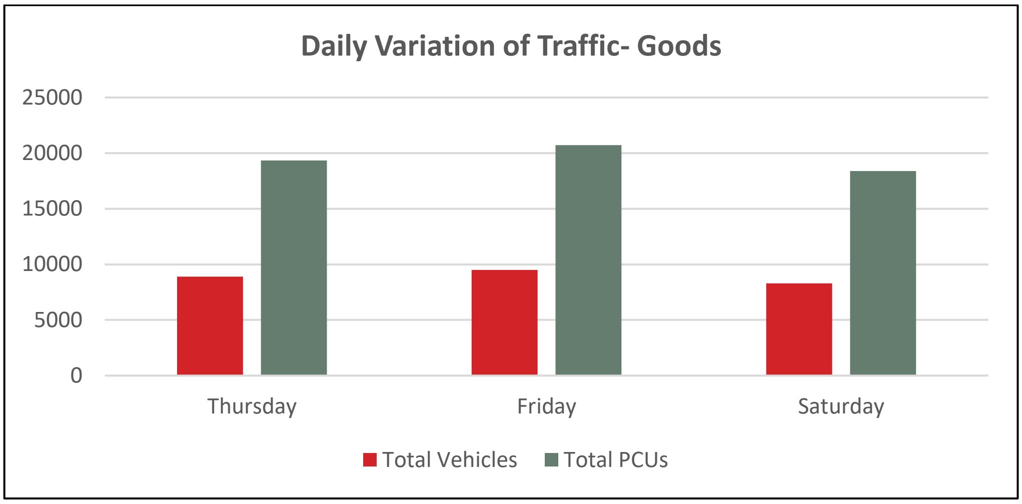

Figure iii-17 Daily Traffic Variation At Kumbalam- Goods Traffic

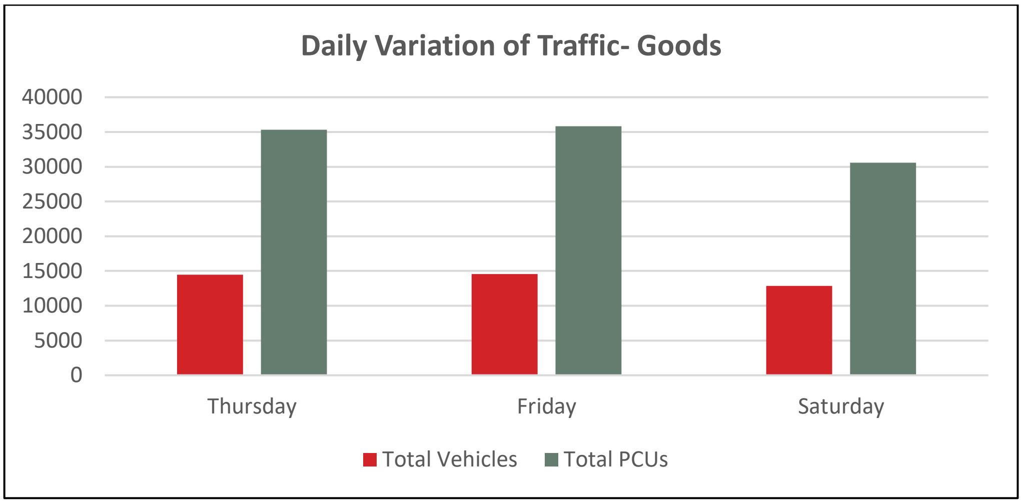

Figure iii-18 Daily Traffic Variation At Paliyekkara - Goods Traffic

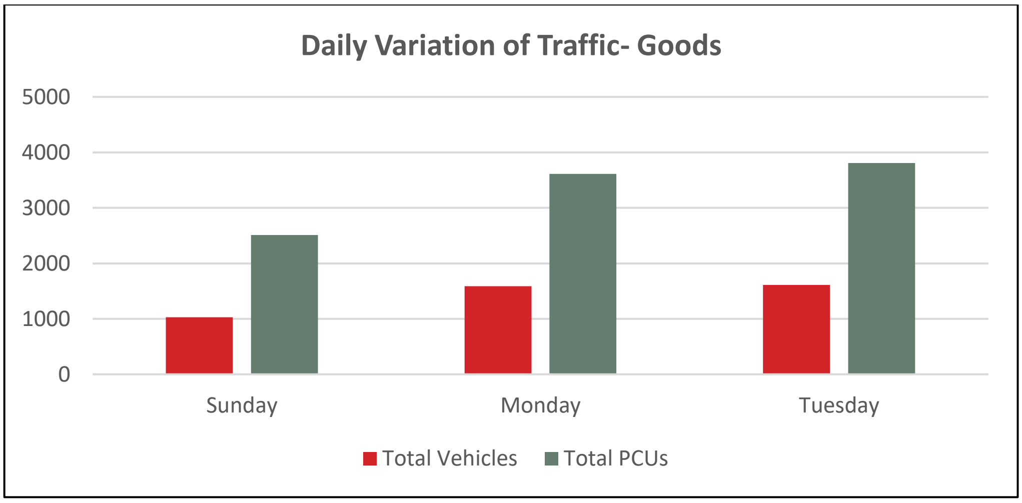

Figure iii-19 Daily Traffic Variation At Gurupadapuri - Goods Traffic

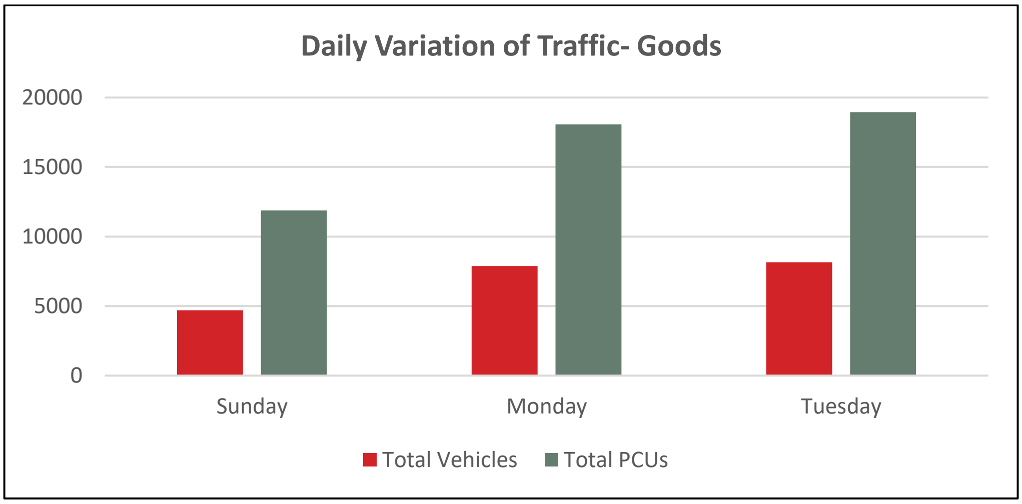

Figure iii-20 Daily Traffic Variation at Azhinjillam - Goods Traffic

iii.3 RESULTS OF STATED PREFERENCE SURVEY ANALYSIS

iii.3.1 Mode: 1AC Class - Railways

```
LOGISTIC REGRESSION VARIABLES Response
  /METHOD=ENTER Time Cost
  /CLASSPLOT
  /PRINT=GOODFIT CORR
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		07-JAN-2020 11:07:16
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	240
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES Response /METHOD=ENTER Time Cost /CLASSPLOT /PRINT=GOODFIT CORR /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.02

Elapsed Time	00:00:00.03

[DataSet0]

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	240	100.0
	Missing Cases	0	.0
	Total	240	100.0
Unselected Cases		0	.0
Total		240	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
.00	0
1.00	1

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 0	Response	.00	0	120	.0
		1.00	0	120	100.0

Overall Percentage			50.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.000	.129	.000	1	1.000	1.000

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Time	9.600	1	.002
		Cost	140.625	1	.000
	Overall Statistics		150.225	2	.000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	202.020	2	.000
	Block	202.020	2	.000
	Model	202.020	2	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	130.690[a]	.569	.759

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	13.897	4	.008

Contingency Table for Hosmer and Lemeshow Test

		Response = .00		Response = 1.00		Total
		Observed	Expected	Observed	Expected	
Step 1	1	38	39.740	2	.260	40
	2	38	37.760	2	2.240	40
	3	33	30.021	7	9.979	40
	4	10	9.979	30	30.021	40
	5	1	2.240	39	37.760	40
	6	0	.260	40	39.740	40

Classification Table[a]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 1	Response	.00	109	11	90.8
		1.00	11	109	90.8
	Overall Percentage				90.8

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Time	-.147	.033	20.408	1	.000	.863
	Cost	-.020	.002	62.401	1	.000	.981
	Constant	-15.277	4.832	9.995	1	.002	.000

a. Variable(s) entered on step 1: Time, Cost.

Correlation Matrix

		Constant	Time	Cost
Step 1	Constant	1.000	.981	.201
	Time	.981	1.000	.384
	Cost	.201	.384	1.000

Step number: 1

Observed Groups and Predicted Probabilities

Predicted Probability is of Membership for 1.00

The Cut Value is .

Symbols: 0 - .00

1 - 1.00

Each Symbol Represents 2.5 Cases.

iii.3.2 Mode: 2AC Class - Railways

```
LOGISTIC REGRESSION VARIABLES Response
  /METHOD=ENTER Time Cost
  /CLASSPLOT
  /PRINT=GOODFIT CORR
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		07-JAN-2020 11:10:15
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	144
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES Response /METHOD=ENTER Time Cost /CLASSPLOT /PRINT=GOODFIT CORR /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.02

[DataSet0]

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	144	100.0
	Missing Cases	0	.0

Total	144	100.0
Unselected Cases	0	.0
Total	144	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
.00	0
1.00	1

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 0	Response	.00	79	0	100.0
		1.00	65	0	.0
	Overall Percentage				54.9

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)

Step 0	Constant	-.195	.167	1.357	1	.244	.823

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Time	.252	1	.615
		Cost	81.436	1	.000
	Overall Statistics		81.689	2	.000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	102.195	2	.000
	Block	102.195	2	.000
	Model	102.195	2	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	96.068[a]	.508	.680

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	1.339	4	.855

Contingency Table for Hosmer and Lemeshow Test

		Response = .00		Response = 1.00		Total
		Observed	Expected	Observed	Expected	
Step 1	1	23	23.525	1	.475	24
	2	23	23.301	1	.699	24
	3	17	15.801	7	8.199	24
	4	14	13.547	10	10.453	24
	5	1	1.674	23	22.326	24
	6	1	1.152	23	22.848	24

Classification Table[a]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 1	Response	.00	77	2	97.5
		1.00	19	46	70.8
	Overall Percentage				85.4

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Time	-.026	.034	.589	1	.443	.974
	Cost	-.016	.003	38.105	1	.000	.984
	Constant	1.870	5.438	.118	1	.731	6.489

a. Variable(s) entered on step 1: Time, Cost.

Correlation Matrix

		Constant	Time	Cost
Step 1	Constant	1.000	.982	-.090
	Time	.982	1.000	.094
	Cost	-.090	.094	1.000

Step number: 1

Predicted Probability is of Membership for 1.00

The Cut Value is .50

Symbols: 0 - .00

1 - 1.00

Each Symbol Represents 2 Cases.

iii.3.3 Mode: 3AC Class - Railways

```
LOGISTIC REGRESSION VARIABLES Response
  /METHOD=ENTER Time Cost
  /CLASSPLOT
  /PRINT=GOODFIT CORR
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		07-JAN-2020 11:15:44
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	48
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES Response /METHOD=ENTER Time Cost /CLASSPLOT /PRINT=GOODFIT CORR /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03

[DataSet0]

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	48	100.0
	Missing Cases	0	.0
	Total	48	100.0
Unselected Cases		0	.0
Total		48	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
.00	0
1.00	1

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 0	Response	.00	0	21	.0
		1.00	0	27	100.0
	Overall Percentage				56.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.251	.291	.746	1	.388	1.286

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Time	4.148	1	.042
		Cost	18.286	1	.000
	Overall Statistics		22.434	2	.000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	28.008	2	.000
	Block	28.008	2	.000
	Model	28.008	2	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	37.782[a]	.442	.593

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	14.255	4	.007

Contingency Table for Hosmer and Lemeshow Test

		Response = .00		Response = 1.00		Total
		Observed	Expected	Observed	Expected	
Step 1	1	6	7.659	2	.341	8
	2	6	5.573	2	2.427	8
	3	8	5.238	0	2.762	8
	4	1	1.298	7	6.702	8
	5	0	1.103	8	6.897	8

6	0	.129	8	7.871	8

Classification Table[a]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 1	Response	.00	20	1	95.2
		1.00	4	23	85.2
	Overall Percentage				89.6

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Time	-.152	.064	5.616	1	.018	.859
	Cost	-.012	.003	12.997	1	.000	.988
	Constant	-18.504	9.404	3.872	1	.049	.000

a. Variable(s) entered on step 1: Time, Cost.

Correlation Matrix

		Constant	Time	Cost
Step 1	Constant	1.000	.990	.409
	Time	.990	1.000	.528
	Cost	.409	.528	1.000

Step number: 1

Predicted Probability is of Membership for 1.00

The Cut Value is .50

Symbols: 0 - .00

1 - 1.00

Each Symbol Represents .5 Cases.

iii.3.4 Mode: Sleeper Class – Railways

```
LOGISTIC REGRESSION VARIABLES Response
  /METHOD=ENTER Time Cost
  /CLASSPLOT
  /PRINT=GOODFIT CORR
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		07-JAN-2020 12:15:13
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	246
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing

Syntax		LOGISTIC REGRESSION VARIABLES Response /METHOD=ENTER Time Cost /CLASSPLOT /PRINT=GOODFIT CORR /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.03

[DataSet0]

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	246	100.0
	Missing Cases	0	.0
	Total	246	100.0
Unselected Cases		0	.0
Total		246	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
.00	0
1.00	1

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 0	Response	.00	149	0	100.0
		1.00	97	0	.0
	Overall Percentage				60.6

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.429	.130	10.825	1	.001	.651

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Time	2.060	1	.151
		Cost	159.339	1	.000
	Overall Statistics		161.399	2	.000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	225.007	2	.000

	Block	225.007	2	.000
	Model	225.007	2	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	104.946[a]	.599	.812

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7.138	4	.129

Contingency Table for Hosmer and Lemeshow Test

		Response = .00		Response = 1.00		Total
		Observed	Expected	Observed	Expected	
Step 1	1	41	40.968	0	.032	41
	2	40	40.865	1	.135	41
	3	38	36.760	3	4.240	41
	4	28	27.573	13	13.427	41
	5	1	2.272	40	38.728	41
	6	1	.562	40	40.438	41

Classification Table[a]

Observed	Predicted

			Response		Percentage Correct
			.00	1.00	
Step 1	Response	.00	147	2	98.7
		1.00	17	80	82.5
	Overall Percentage				92.3

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Time	-.288	.112	6.565	1	.010	.750
	Cost	-.025	.003	52.428	1	.000	.975
	Constant	-31.632	16.616	3.624	1	.057	.000

a. Variable(s) entered on step 1: Time, Cost.

Correlation Matrix

		Constant	Time	Cost
Step 1	Constant	1.000	.995	.287
	Time	.995	1.000	.381
	Cost	.287	.381	1.000

iii.3.5 Mode: AC Bus

```
LOGISTIC REGRESSION VARIABLES Response
  /METHOD=ENTER Time Cost
  /CLASSPLOT
  /PRINT=GOODFIT CORR
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		07-JAN-2020 12:07:44
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	300
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES Response /METHOD=ENTER Time Cost /CLASSPLOT /PRINT=GOODFIT CORR /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.05
	Elapsed Time	00:00:00.04

[DataSet0]

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	300	100.0
	Missing Cases	0	.0
	Total	300	100.0
Unselected Cases		0	.0
Total		300	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
.00	0
1.00	1

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 0	Response	.00	178	0	100.0
		1.00	122	0	.0
	Overall Percentage				59.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.378	.118	10.330	1	.001	.685

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Time	3.537	1	.060
		Cost	199.015	1	.000
	Overall Statistics		202.551	2	.000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	288.749	2	.000
	Block	288.749	2	.000
	Model	288.749	2	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	116.624[a]	.618	.834

a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	2.498	4	.645

Contingency Table for Hosmer and Lemeshow Test

		Response = .00		Response = 1.00		Total
		Observed	Expected	Observed	Expected	
Step 1	1	50	49.983	0	.017	50
	2	50	49.896	0	.104	50
	3	46	45.408	4	4.592	50
	4	30	30.835	20	19.165	50
	5	1	1.610	49	48.390	50
	6	1	.269	49	49.731	50

Classification Table[a]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 1	Response	.00	176	2	98.9
		1.00	24	98	80.3
	Overall Percentage				91.3

a. The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)

Step 1ᵃ	Time	-.121	.036	11.045	1	.001	.886
	Cost	-.028	.004	49.654	1	.000	.972
	Constant	-9.059	5.450	2.763	1	.096	.000

a. Variable(s) entered on step 1: Time, Cost.

Correlation Matrix

		Constant	Time	Cost
Step 1	Constant	1.000	.964	.121
	Time	.964	1.000	.377
	Cost	.121	.377	1.000

iii.3.6 Mode: Non-AC Bus

```
LOGISTIC REGRESSION VARIABLES Response
  /METHOD=ENTER Time Cost
  /CLASSPLOT
  /PRINT=GOODFIT CORR
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Logistic Regression

Notes

Output Created		07-JAN-2020 12:12:21
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	630
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing
Syntax		LOGISTIC REGRESSION VARIABLES Response /METHOD=ENTER Time Cost /CLASSPLOT /PRINT=GOODFIT CORR /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03

[DataSet0]

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	630	100.0
	Missing Cases	0	.0
	Total	630	100.0
Unselected Cases		0	.0
Total		630	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
.00	0
1.00	1

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 0	Response	.00	361	0	100.0
		1.00	269	0	.0
	Overall Percentage				57.3

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.294	.081	13.338	1	.000	.745

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Time	22.583	1	.000
		Cost	377.663	1	.000
	Overall Statistics		400.246	2	.000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	551.860	2	.000
	Block	551.860	2	.000
	Model	551.860	2	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	308.023[a]	.584	.784

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	31.513	4	.000

Contingency Table for Hosmer and Lemeshow Test

		Response = .00		Response = 1.00		Total
		Observed	Expected	Observed	Expected	
Step 1	1	105	104.867	0	.133	105
	2	104	103.467	1	1.533	105
	3	99	94.778	6	10.222	105
	4	41	46.555	64	58.445	105
	5	6	10.356	99	94.644	105

6	6	.978	99	104.022	105

Classification Table[a]

Observed			Predicted		
			Response		Percentage Correct
			.00	1.00	
Step 1	Response	.00	308	53	85.3
		1.00	7	262	97.4
	Overall Percentage				90.5

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Time	-.491	.070	48.584	1	.000	.612
	Cost	-.022	.002	146.011	1	.000	.978
	Constant	-63.651	10.305	38.150	1	.000	.000

a. Variable(s) entered on step 1: Time, Cost.

Correlation Matrix

		Constant	Time	Cost
Step 1	Constant	1.000	.997	.466
	Time	.997	1.000	.533
	Cost	.466	.533	1.000

VOLUME III: PART 3B & 3C

(PREPARED & SUBMITTED BY M/s P.K Engineers)

DETAILED PROJECT REPORT – (VOLUME III: PART 3B & 3C)

DETAILED PROJECT REPORT FOR SILVERLINE (SEMI HIGH SPEED RAIL) FROM THIRUVANANTHAPURAM TO KASARAGOD

APPROVAL

Version	Name		Position	Date
1	Production	M/s P.K Engineers	-	06-06-2020
	Consolidation	Hemant	PM	08-06-2020
	Check	M Suyambulingam	Project Director	09-06-2020
	Establishment of liability for the entity			

Traffic and Transportation Survey Report for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

MARCH 2020

M/s. PK Engineers

Office Address: A-21, Rajgarh Road, PilanI, Jhunjhunu,
Rajasthan Pin-333031

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CHAPTER 1: INTRODUCTION

1.1 Background

As per GO (Ms) No. 52/2016/Trans dated 05/08/2016 and GO (Ms) No. 57/2016/Trans dated 01.09.2016 a Joint Venture Agreement between Government of Kerala and Ministry of Railways, Government of India for the Infrastructure Development of Railways in Kerala on 51:49 Equity Participation was signed on 1st September 2016 at New Delhi.

The Joint Venture Company would undertake Project development works for an identified basket of Projects, which will inter-alia include surveys, preparation of Detailed Project Report (DPR) and getting requisite approvals, processing for sanctioning of identified Projects and implementation of the sanctioned Project. Once the Project is sanctioned, the Land Acquisition will be done by the State Government and Project implementation by the Project Special Purpose Vehicle (SPV) in consultation with Ministry of Railways. The KERALA RAIL DEVELOPMENT CORPORATION LIMITED was incorporated on 03rd January 2017 with Ministry of Corporate Affairs and the Certificate of Incorporation Number (CIN) of the Company is U63030KL2017SGC047699.

The present study of preparation of Detailed Project Report for “Trivandrum to Kasaragod Semi-High Speed Rail Corridor” starts from Trivandrum in Trivandrum district and ends at Kasargod in Kannur district with a length of 565 km.

M/s. PK Engineers has been awarded this project to conduct the Traffic & Transportation Study in the state of Kerala. There are 07 types of surveys involved and the study area is presented in the Figure **1 & 2 below.**

1.2 Objective

The Traffic and Transportation Surveys are required to be carried out for the preparation of Detailed Project Report for the construction of Semi High Speed Rail Corridor between Thiruvananthapuram and Kasaragod, being undertaken by Kerala Rail Development Corporation Limited (KRDCL), Thiruvananthapuram.

1.3 Scope

The services that will be provided by the consultant during the performance of the Traffic Revenue Due Diligence shall cover:

- 3 days (3days X 24hours) classified Traffic Volume Count (Video graphic counts) at 18 locations including one Holiday/ Sunday.
- A 24 hour Vehicle Occupancy Survey- Mode-wise Occupancy Survey at all the TVC locations for 24 hours simultaneously with the traffic volume count.

- Origin Destination Survey (Passenger Vehicles and Goods Vehicles) for 24 hours simultaneously with the traffic volume count (Sample size for OD survey, minimum 20%).
- A 24 hour Passenger Terminal Origin Destination Survey at identified Airport (4), Bus terminal (4) and Train Terminals (4).
- Stated Preference/ Willingness to Pay Survey onboard train and bus as well as at Rail, Bus and Air Terminals (Sample size, minimum 1000).
- Survey of Truck Operators, Cargo Forwarding Agencies and Railway Parcel Services (The survey should cover 100 truck operators).
- Establishment of seasonal correction factors (SCFs) to arrive at the Average annual daily traffic on the project road traffic using most relevant method considering the availability of historical traffic data of project road sections and fuel sales data along the project road.
- Review and analysis of the available relevant information like past traffic study reports, past traffic and revenue data, socio-economic data like GDP/GSDP/NSDP, PCI, and Inflation etc.
- Also assessment and conduct of additional traffic surveys will be finalised upon discussion with the Client. A 3 days / 1 day count and 24 hour OD survey / (optional) will be carried out at each additional survey location.

1.4 Structure of this Report

The formation of the report is discussed as below:

Chapter 1: Introduction
Chapter covers the background of Project Road, objective and scope of services and structure of this project Report.

Chapter 2: Traffic Survey and Analysis
This chapter covers the Traffic Surveys and analysis related to the project.

1.5 Compliance & Comments

Comments received on Traffic report from Systra/KRDCL and our compliance- Part-A

S No	Comments by Systra/KRDCL	Response by PK Engineers	Status of Submission
1	Kindly confirm that the zoning codes adopted is same as the one shared by us. For Origin/ Destination outside India, please use **200** as zone code.	Yes, we are adopting the same zoning code shared by client, we are using 200 zone code for the international trips (Outside India).	OK
2	For better understanding of the Origin/ Destination, provide name of the place along with the Code for all the surveys	Sir, we will share the data as you require as soon as possible , but it will take long time because the data has already punched.	shared with mail dated 10th Dec 2019
3	The Origin/ Destination coding not done for the surveys; Passenger OD at terminals, Survey of Truck Operators, Cargo Forwarding Agencies & Railway Parcel Services and Stated Preference Survey. Kindly send the data after coding.	We will send the coded data very shortly for Passenger OD terminals , Survey of Truck Operators, Cargo Forwarding Agencies & Railway Parcel Services and Stated Preference Survey .	shared with mail dated 10th Dec 2019
4	One hour data missing in 1st day at TVC-16, Kindly verify and provide the same.	For CVC data we will send you the TVC-16 data .	shared with mail dated 10th Dec 2019
5	TVC 16 is at Azhinjillam, kindly correct name in TVC and OD files.	We corrected the names of TVC -16 in both CVC & OD , we will share the data very shortly .	shared with mail dated 10th Dec 2019
6	Provide the average occupancy for each category of vehicle at 15 minutes interval.	We will do the average occupancy at 15 minute interval , but it will take time .	shared with mail dated 10th Dec 2019

7	In the Terminal Surveys, travel cost of passengers, especially at Airports, appears not realistic (Very high or quite low from normal range). Please verify the same.	Travel cost of passengers especially at airports , we will again check the data with hard copies and revert back very shortly.	High Cost : The cost has been mentioned in the data is the total cumuting cost from his home to final destination which includes taxi and air fare. Moreover, the passengers who are travelling they don't provide good enough time for the survey and sometimes they dont provide the true/actual details.
8	In the OD Survey data, most of the respondents (both Passengers & Goods) are willing to shift to SHSR. The percentage is as high as 90% and in some locations it is even 100%. We fear that the question was not properly conveyed. Need to discuss.	In the OD Survey respondents really want to shift to SHSR as the present road condition is very bad , people actually want new facility to travel to save time .	The question regarding willing to shift has been asked by the trained and eduacted enumerators. We don't have any doubt that the question has been asked not properly . Moreover it also depends upon the fare (1.5 times), they were willing to shift to SHSR.
9	Same is the case with Stated Preference Survey, in which most of the respondents are willing to shift to SHSR, viz. Super-fast Bus, Sleeper & 2 AC Trains, Airports - Calicut, Kannur, Ernakulam. It seems question was not properly presented and we don't think this data is realistic and useful for the analysis. Please discuss.	In stated preference survey , we had cross verify with the hard copies of data , there would be some typing error ,that we had corrected and enclosed with this mail .{Enclosed data with this mail} . But the response we got from the survey the passengers actually want new facility , most of it want to avail the new facility , most of the passengers want to travel with new facility like SHSR .	After corrected the typo error, there has been a small change. Howeverthe percentage of shift is similar as point no 8.
10	Kindly confirm whether data of parcel service submitted is the list of entire parcels handled in one day at the Railway Stations, or only the representative sample in a day. Please note that our requirement is details of entire parcels handled in a sample day at the stations.	10. The data which we had collected for parcel services it is for entire 24 days duration.	OK

Comments received on Traffic report from Systra/KRDCL and our compliance- Part-B

Sl No	Comments by Systra/KRDCL	Response by PK Engineers	Comments by Systra/KRDCL	Response by PK Engineers
1	As per the scope, the Survey Agency is supposed to collect the secondary data of parcel services through Kerala Railway Network for past five years. However the same is not received till date. Kindly provide the same.	We tried our level best, the representative at all the locations , they provided us one day which has been already shared with you . Moreover they replied that the past five years data we cannot share with you . You need to come through our senior officials (The Railway Ministry). Instead of 5 Parcel Railway services , we covered 7 to justify the data .	Had you informed this difficulty with KRDCL earlier, the permission issue would have been resolved. It is strange that you are informing about the permission issue now. Consult KRDCL Officials for the permission and collect the same at the earliest.	The secondary data (rail parcel) will be collected with the additional surveys has been alloted to PK.Engineers .
2	Data corresponding to only 15 freight forwarding agencies has been submitted, while the requirement is minimum of 20 agencies	We are sharing the complete data with you . There was some temporar error , please find the updated one . Revised List will enclosed with the mail .	It appears that the additional 5 agencies data is CREATED now. It is quite unfortunate that details of missing data or error in the data was not informed till we raised the issue.	The data has been shared is for 20 freight forwarding agencies . There is no data created after the surveys completed. The data could be verified with the agencies, Their communication numbers are presented in the data.
a.	Also kindly confirm whether these samples correspond to all the freight transactions by the agency in a sample day or only some of the transations in a day. Please note you are required to collect all the transactions in a sample day.	As per the RFP we had covered the survey .	The survey format clearly indicates to collect details of the Freight Forwarded on a sample day. Kindly confirm.	Yes the surveys details of the agencies has been collected in a sample day .
b.	Samples should have covered Kerala and Border districts of Tamil Nadu and Karnataka. However, the Data submitted doesn't include any agency in Tamil Nadu or Karnataka.	We had covered Border districts of Tamil Nadu and Karnataka . Some sheets missing to punch , we rectify that and enclosed the revised oncce for your perusal.	Refer above response for 2. Also the format seems different from what we have shared; contact number of agencies are missing for all the data. We cannot accept this data as there is no authenticity to cross check the data without contact number.	As per our RFP, we had covered the sample around the kerala border districts of Tamil Nadu and karnataka.

3	In Truck Operators survey data, samples from each Truck Operator Seems quite low. Only one sample has been provided for some of the Truck Operators. This is not acceptable.	Sir, we had covered around 115 truck operators in all over the km .These people entertain us what type of fleet or no of fleet are plying on the road or these days , they provide those information to us. Moreover there is a demand of 100 truck operators , But we had provide 115 truck operators .	Please note the quality of the data is important rather than quantity. It seems the survey format was not properly understood by the Surveyor. The data received is incomplete and unacceptable.	As per our Knowledge and understanding , we have collected complete information .
4	Kindly indicate details of percentage sample or method of sampling adopted for Passenger OD at Terminals.	As per the RFP we had covered the survey .	The response is not clear, kindly give the details of sampling.	1 in every 10th passenger was selected for sampling .
5	Please provide average occupancy along with number of vehicles counted, at 15 minutes interval.	Sir, we will provide the average occupancy along with the number of vehicles counted at 15 minutes interval.	Kindly provide the data as early as possible. It has been long time since we have notified about this requirement.	Shared with mail dated 10th Dec 2019

Comments received on Traffic report from Systra/KRDCL and our compliance- Part-C

S No	Comments by Systra/KRDCL	Response by- PK Engineers	Comments by Systra/KRDCL	Response by- PK Engineers
1	Kindly confirm that the zoning codes adopted is same as the one shared by us. For Origin/ Destination outside India, please use **200** as zone code.	OK	OK	This is Complied
2	For better understanding of the Origin/ Destination, provide name of the place along with the Code for all the surveys	Shared with mail dated 10th Dec 2019	OK	This is Complied
3	The Origin/ Destination coding not done for the surveys; Passenger OD at terminals, Survey of Truck Operators, Cargo Forwarding Agencies & Railway Parcel Services and Stated Preference Survey. Kindly send the data after coding.	Shared with mail dated 10th Dec 2019	OK	This is Complied
4	One-hour data missing in 1st day at TVC-16, Kindly verify and provide the same.	Shared with mail dated 10th Dec 2019	Noted. Kindly share the video file of this additional one-hour traffic by Email for cross check.	There was some issue with the DVR,the data was not retrived from it.So, we interpolate the data w.r.t. subsequent hours.
5	TVC 16 is at Azhinjillam, kindly correct name in TVC and OD files.	Shared with mail dated 10th Dec 2019	OK	This is Complied
6	Provide the average occupancy for each category of vehicle at 15 minutes interval.	Shared with mail dated 10th Dec 2019	OK	This is Complied

7	In the Terminal Surveys, travel cost of passengers, especially at Airports, appears not realistic (Very high or quite low from normal range). Please verify the same.	High Cost : The cost has been mentioned in the data is the total commuting cost from his home to final destination which includes taxi and air fare.	It was clearly mentioned in the format that travel cost required is between Terminal Station & Initial Origin for Boarding passengers and between Final Destination & Terminal Station for Alighting passengers. How can there be any confusion? It seems enumerators themselves do not have proper awareness of questionnaire and query was not properly communicated.	The enumerators were trained accordingly, but the users were not providing good enough time. They don't want to miss there rides.
		Moreover, the passengers who are travelling they don't provide good enough time for the survey and sometimes they dont provide the true/actual details.	Also, some travel cost data includes air fare, and some do not, this clearly indicates miscommunication and lack of training given to enumerators.	
8	In the OD Survey data, most of the respondents (both Passengers & Goods) are willing to shift to SHSR. The percentage is as high as 90% and in some locations, it is even 100%. We fear that the question was not properly conveyed. Need to discuss.	The question regarding willing to shift has been asked by the trained and educated enumerators. We don't have any doubt that the question has been asked not properly. Moreover, it also depends upon the fare (1.5 times), they were willing to shift to SHSR.	Even at same fare as present mode this much higher willingness to shift is not logical as there are factors like trip distance, privacy, last mile connectivity, comfort etc. other than fare which will affect the decision to shift. Clearly the results from data are not logical and cannot be accepted.	The enumerators were trained accordingly, the data recorded while survey are true.
9	Same is the case with Stated Preference Survey, in which most of the respondents are willing to shift to SHSR, viz. Super-fast Bus, Sleeper & 2 AC Trains, Airports - Calicut, Kannur, Ernakulam. It seems question was not properly presented, and we don't think this data is realistic and useful for the analysis. Please discuss.	After corrected the typo error, there has been a small change. However, the percentage of shift is similar as point no 8.	As per data, the willingness to shift to SHSR from Sleeper Class Train is about 95% at a fare of Rs 500 (almost 3 times the current fare of Sleeper Class) and frequency of 30 min. Clearly this result not logical.	The enumerators were trained accordingly, the data recorded while survey are true.
10	Kindly confirm whether data of parcel service submitted is the list of entire parcels handled in one day at the Railway Stations, or only the representative sample in a day. Please note that our requirement is details of entire parcels handled in a sample day at the stations.	OK	OK	This is Complied

11	As per the scope, the Survey Agency is supposed to collect the secondary data of parcel services through Kerala Railway Network for past five years. However the same is not received till date. Kindly provide the same.	The secondary data (rail parcel) will be collected with the additional surveys has been allotted to PK.Engineers.	Do the needful to collect this data as early as possible, as this data is required for analysis of survey data already collected.	Mr. CM Rajan of SYSTRA has been shared with P.K Engineers which has been been punched and incorporated in the shared report.
12	Data corresponding to only 15 freight forwarding agencies has been submitted, while the requirement is minimum of 20 agencies	The data has been shared is for 20 freight forwarding agencies. There is no data created after the surveys completed. The data could be verified with the agencies, Their communication numbers are presented in the data.	Noted. We see that contact number of agencies are included in the data currently submitted, which was absent in the previously submitted data. Whether these contact numbers are noted in original survey sheets?	This is Complied
a.	Also kindly confirm whether these samples correspond to all the freight transactions by the agency in a sample day or only some of the transactions in a day. Please note you are required to collect all the transactions in a sample day.	Yes, the surveys details of the agencies has been collected in a sample day.	As per data, many agencies are having only one transaction in a day. Hence the concern whether all the transactions in a sample day are covered or not. Kindly clarify.	This is Complied
b.	Samples should have covered Kerala and Border districts of Tamil Nadu and Karnataka. However, the Data submitted doesn't include any agency in Tamil Nadu or Karnataka.	As per our RFP, we had covered the sample around the Kerala border districts of Tamil Nadu and Karnataka.	Refer response for 2	As per our RFP, we had covered the sample around the Kerala border districts of Tamil Nadu and Karnataka.
13	In Truck Operators survey data, samples from each Truck Operator Seems quite low. Only one sample has been provided for some of the Truck Operators. This is not acceptable.	As per our Knowledge and understanding, we have collected complete information.	Please note that data is incomplete as sample per truck operator is unacceptably low, only one sample has been provided for some truck operators.	This is Complied
14	Kindly indicate details of percentage sample or method of sampling adopted for Passenger OD at Terminals.	1 in every 10th passenger was selected for sampling.	Noted. Kindly elaborate how sample size required was estimated, whether total passengers going in and out of terminal was counted prior to the survey?	It has not been counted the total passenegers. But while collecting the sample we choose the 10th passenger.
15	Please provide average occupancy along with number of vehicles counted, at 15 minutes interval.	Shared with the mail dated 10th Dec 2019	OK	This is Complied

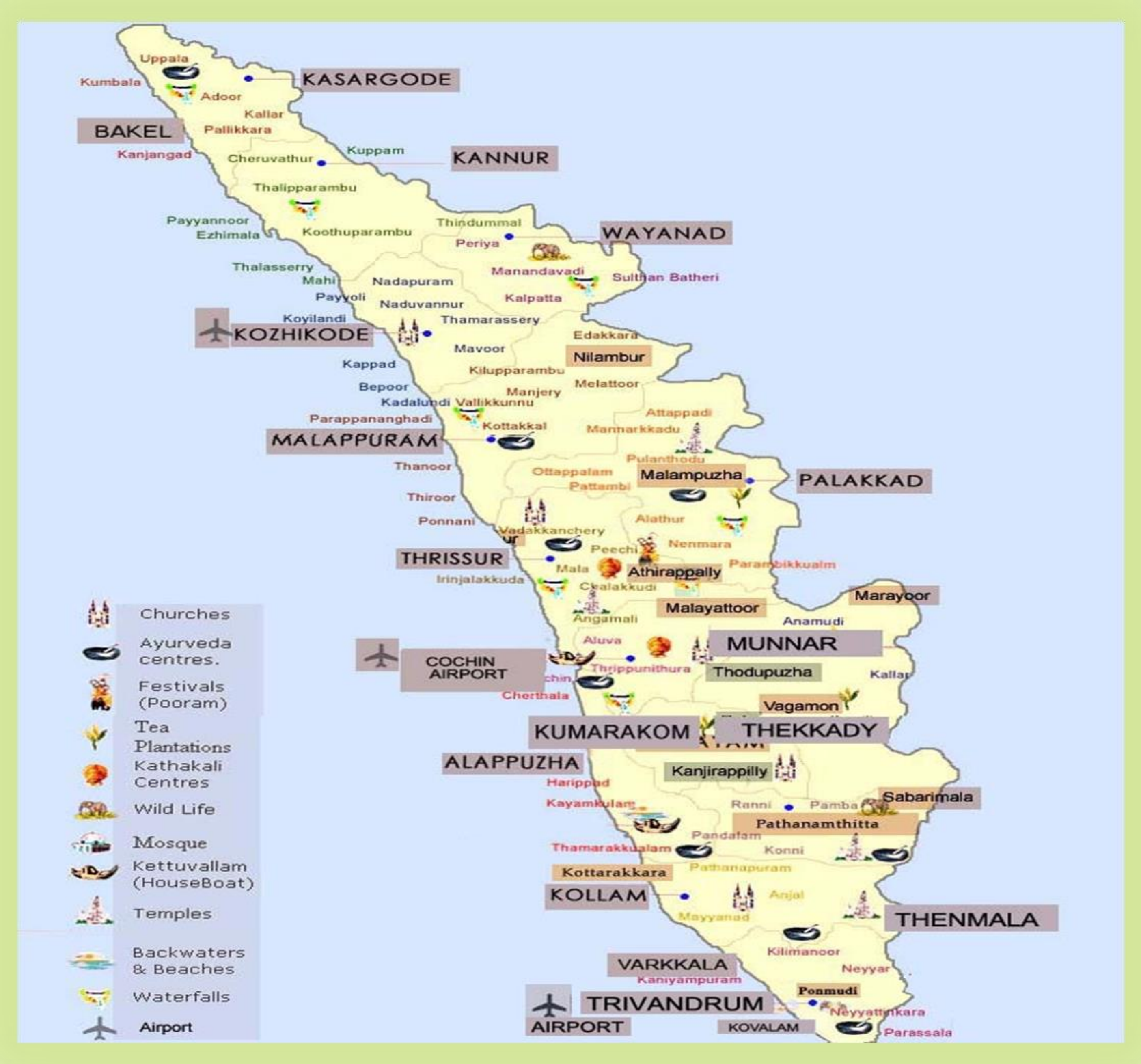


Figure 1 : Project Area

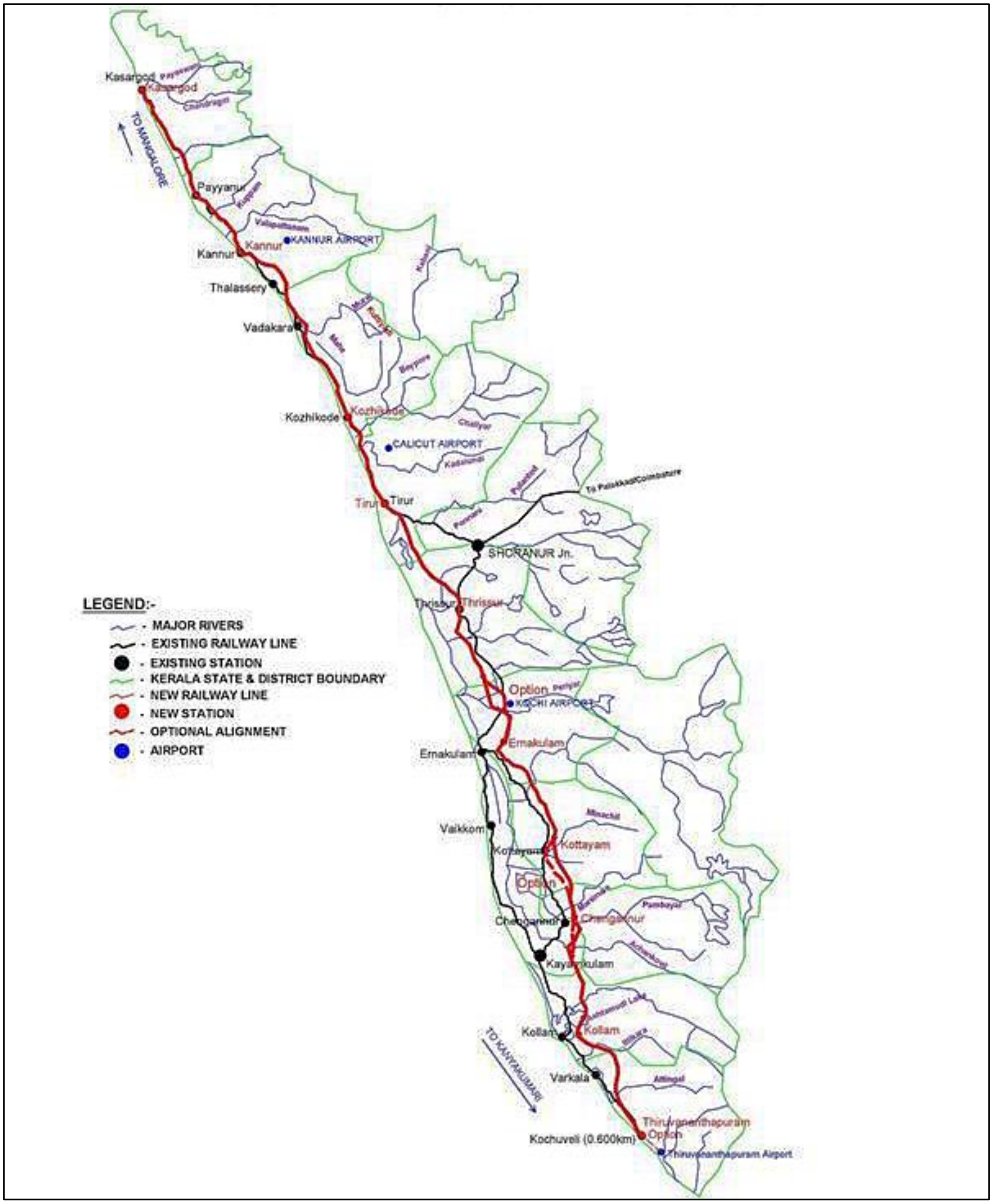


Figure 2: Project Area – Semi High Speed Rail Corridor

CHAPTER 2 TRAFFIC SURVEY AND ANALYSIS

2.0 Traffic Survey and Analysis

2.1 Traffic Survey Details

In order to understand the traffic characteristics and the volume of traffic using the project road were collected through primary survey. Traffic Survey schedule is shown in table 2.1 below:

- 3 days Continuous Classified Traffic Volume Count (Video graphic counts) - 18 locations
- 24 hour Vehicle Occupancy Survey - 18 locations
- 24 hour, Origin Destination Survey - 09 locations
- 24 hour Passenger Terminal Origin Destination Survey Airport (4), Bus terminal (4) and Train Terminals (4). - 12 locations
- Stated Preference/ Willingness to Pay Survey (on-board) - 1000 samples
- Survey of Truck Operators (100), Cargo Forwarding Agencies (20) & Railway Parcel Services (5) - 125 samples

Table2.1: Traffic Survey Schedule

Sr. No.	Location Name	Road	Traffic Volume Count		Occupancy		Origin Destination		Terminal (Bus, Rail/Air)		
			Start Date	End Date	Start Date	End Date	Start Date	End Date	Location Name	Start Date	End Date
1	Thottakadu	NH-66	18/09/2019	21/09/2019	19/09/2019	20/09/2019	20/09/2019	21/09/2019	Trivandrum Bus Stand	20/09/2019	21/09/2019
2	Kilimanoor	MC Road	18/09/2019	21/09/2019	19/09/2019	20/09/2019			Vytila Bus Stand	25/09/2019	26/09/2019
3	Karunagapally	NH-66	22/09/2019	25/09/2019	23/09/2019	24/09/2019	23/09/2019	24/09/2019	Thrissur Bus Stand	30/09/2019	01/10/2019
4	Sasthacotta	SH-37	18/09/2019	21/09/2019	19/09/2019	20/09/2019			Kozhikode Bus Stand	30/09/2019	01/10/2019
5	Adoor Bypass	MC Road	22/09/2019	25/09/2019	23/09/2019	24/09/2019					
6	Ezninjillam	MC Road	22/09/2019	25/09/2019	23/09/2019	24/09/2019	24/09/2019	25/09/2019	Trivandrum Railway Station	20/09/2019	21/09/2019
7	Cherthala	Cherthala Thanneermukkom Road	26/09/2019	29/09/2019	26/09/2019	27/09/2019			Kollam Railway Station	23/09/2019	24/09/2019
8	Udayamperoor	SH-15	15/09/2019	18/09/2019	25/09/2019	26/09/2019			Ernakullam South Railway Station	25/09/2019	26/09/2019
9	Kumbalam Toll Plaza	NH-16	26/09/2019	29/09/2019	26/09/2019	27/09/2019	27/09/2019	28/09/2019	Kozhikode Railway Station	30/09/2019	01/10/2019
10	Kumaranalloor	MC Road	15/09/2019	18/09/2019	25/09/2019	26/09/2019					
11	Paliyekkara Toll Plaza	NH-544	26/09/2019	29/09/2019	26/09/2019	27/09/2019	27/09/2019	28/09/2019			
12	**Moothakunnam**	**NH-66**	15/09/2019	18/09/2019	25/09/2019	26/09/2019			**Trivandrum Airport**	10/10/2019	11/10/2019
13	**Gurupadapuri**	**NH-66**	29/09/2019	02/10/2019	30/09/2019	01/10/2019	30/09/2019	01/10/2019	**Kochi Airport**	27/09/2019	28/09/2019
14	**Edappal**	**SH-69**	15/09/2019	18/09/2019	25/09/2019	26/09/2019			**Kozhikode Airport**	28/09/2019	29/09/2019
15	**Cheruvannur**	**SH-28**	15/09/2019	18/09/2019	25/09/2019	26/09/2019			**Kannur Airport**	29/09/2019	30/09/2019
16	**Azhinjillam**	**NH-66**	29/09/2019	02/10/2019	30/09/2019	01/10/2019	30/09/2019	01/10/2019			
17	**Muzhapilangad Toll Plaza**	**NH-66**	03/10/2019	06/10/2019	03/10/2019	04/10/2019	03/10/2019	04/10/2019	**Operator Survey**	14/09/2019	06/10/2019
18	**Kanhangad**	**NH-66**	03/10/2019	06/10/2019	03/10/2019	04/10/2019	04/10/2019	05/10/2019	**On Board Survey**	20/09/2019	04/10/2019

2.2 Survey Methodology

2.2.1 Classified Traffic Volume Count

The video graphic is used for a period of 3 days to capture the Average Daily Traffic (ADT), at all 18 locations of the Project Area.

The recorded data converted into excel format as per desired and IRC standards. The count data is recorded at 15 minute intervals for each vehicle category. For recording vehicle classification information mode-wise, vehicles were grouped under the categories as shown in **Table 2.2** below

Table2.2: Vehicle Classification System adopted

Motorised Traffic - Passenger	Motorised Traffic - Commercial
2 wheelers	Goods Auto
Auto Rickshaw	Light Commercial Vehicle (LCV)
Private Car (White Number Plate) : Car, Jeep, Van	Truck (2 – Axle Truck, 3 – Axle Truck)
Taxi (Yellow Number Plate) : Car, Jeep, Van	Multi Axle Truck (MAV)
KSRTC Bus AC	Tractor, Tractor with Trailer
KSRTC Bus Non AC	Others Goods
Pvt Bus AC	
Pvt Bus NON AC	
School Bus	
Mini Bus	
Others	

2.2.2 Origin and Destination Survey

In order to understand the travel pattern on the corridor, Origin and Destination (O-D) Surveys were carried out at nine locations (24hours - by the roadside interview), airports (4), bus stands (4) and railway stations (4) along the project corridor as the method described in IRC: 102-1988 (both passenger and commercial vehicles).

For the road side OD survey Police assistance was arranged for carrying out this survey. Vehicles were stopped on a random sampling basis and interviewed.

Trained enumerators under the supervision of traffic engineer collected the trip characteristics using the survey forms designed for this purpose. The information collected during roadside interviews was analysed to obtain the trip length, trip distribution, commodity movement based on a zoning system suitably designed for the study.

2.3 Data Analysis - Classified Traffic Volume Count

The following traffic characteristics have been presented in the following sections:

- Average Daily Traffic (ADT)
- Peak Hour Factor (PHF)
- Daily Variation of Traffic
- Directional distribution
- Peak Hour Details
- Traffic composition

Data collected at the site was computerised for further analysis. The various vehicle types having different size and characteristics were converted into passenger car equivalents. Passenger Car Unit (PCU) equivalent values as suggested in IRC-64-1990 *Guidelines for Capacity of Roads in Rural Areas* were adopted. The PCU equivalent values are presented in **Table 2.3** below.

Table2.3: PCU Equivalence Factors Adopted for Study

Vehicle Type	PCU Value
Private Car (White Number Plate) : Car, Jeep, Van	1.0
Taxi (Yellow Number Plate) : Car, Jeep, Van	1.0
Mini Bus	1.5
KSRTC Bus AC	3.0
KSRTC Bus Non AC	3.0
Pvt Bus AC	3.0
Pvt Bus NON AC	3.0
School Bus	1.5
Others	3.0
2 wheelers	0.5
Auto Rickshaw	1.0
Goods Auto	2.0
Light Commercial Vehicle (LCV)	1.5
Truck (2 – Axle Truck, 3 – Axle Truck)	3.0
Multi Axle Truck (MAV)	4.5
Tractor, Tractor with Trailer	4.5
Others Goods	4.5

Source: IRC: 64-1990

2.3.1. Average Daily Traffic

The Average Daily Traffic (ADT) has been estimated by averaging the 3 days counts. Traffic volume obtained over the period of survey has been averaged to obtain the ADT. ADT in numbers and PCU's obtained for the traffic count locations are presented below in **Table 2.4 & 2.5**.

Table2.4: Location wise - ADT

Vehicle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Car, Jeep, Van	17589	14973	18647	5037	9276	13216	3897	10514	17500	19033	26310	11352	2599	12532	10556	21147	9030	8646
Taxi	833	765	760	336	551	630	446	782	1432	912	2273	1384	346	699	552	1004	519	440
Mini Bus	375	290	341	87	158	252	90	302	466	291	597	367	170	402	121	328	225	151
KSRTC Bus AC	64	29	57	1	0	38	1	37	44	36	99	11	1	24	15	27	8	6
KSRTC Bus Non AC	1006	877	1024	387	12	873	217	797	685	855	1340	328	174	318	670	42	181	341
Pvt Bus AC	108	57	94	3	42	73	10	79	121	162	217	59	9	62	102	66	56	42
Pvt Bus NON AC	356	169	300	302	60	141	118	53	497	1358	1189	573	132	877	1489	320	749	628
School Bus	125	54	114	53	22	40	46	84	168	112	147	89	90	88	57	51	103	77
Others	4	3	1	5	59	0	3	0	1	42	88	14	0	27	25	102	35	48
2 wheelers	12341	10487	31997	13789	5285	8802	12509	16118	26893	15791	27852	17760	6526	17574	22529	19488	9954	8290
Auto Rickshaw	2008	2569	3683	1225	670	1170	2010	2164	2302	3343	3563	1754	1758	3663	3089	1998	2452	2178
Goods Auto	1435	1080	2038	671	101	1297	662	1058	2911	229	670	306	521	285	693	367	418	177
LCV	1264	723	1251	294	1242	840	251	426	2624	2023	7836	1825	248	1715	2118	3974	2844	1942
Truck	669	390	739	140	421	586	120	213	1696	522	2056	471	302	55	585	1058	1075	897
MAV	487	247	711	119	246	511	64	171	1668	519	3388	470	331	31	225	1510	1049	1183
Tractor Trailer	1	0	2	0	0	1	1	1	2	0	2	1	4	0	0	2	2	1
Others Goods	6	0	0	0	1	3	2	1	5	0	10	0	0	0	0	0	2	0
Passenger Vehicles	***34809***	***30273***	***57018***	***21225***	***16135***	***25235***	***19347***	***30930***	***50109***	***41935***	***63675***	***33691***	***11805***	***36266***	***39205***	***44573***	***23312***	***20847***
Freight Vehicles	***3862***	***2440***	***4741***	***1224***	***2011***	***3238***	***1100***	***1870***	***8906***	***3293***	***13962***	***3073***	***1406***	***2086***	***3621***	***6911***	***5390***	***4200***
Total Vehicles	**38671**	**32713**	**61759**	**22449**	**18146**	**28473**	**20447**	**32800**	**59015**	**45228**	**77637**	**36764**	**13211**	**38352**	**42826**	**51484**	**28702**	**25047**

Table2.5: Location wise – PCU

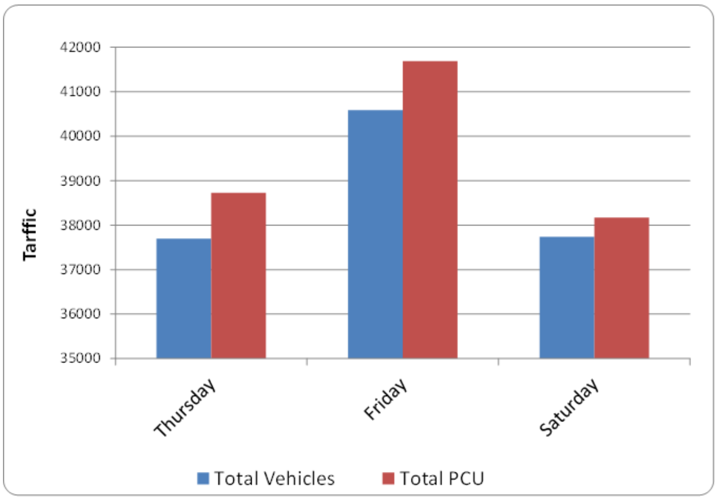
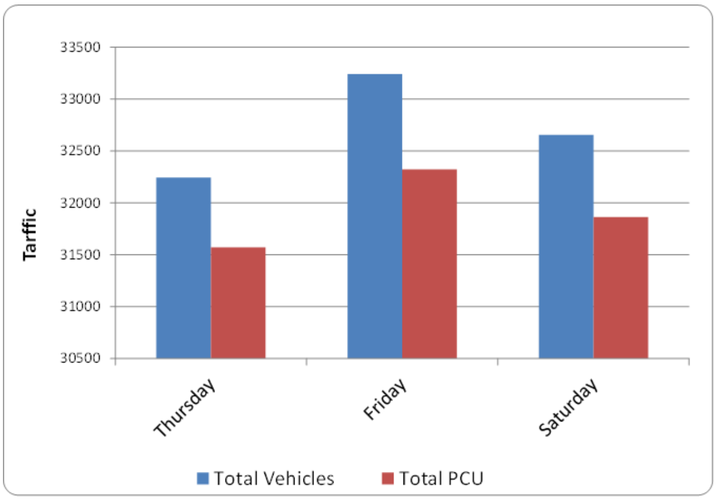
Vehicle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Car, Jeep, Van	17589	14973	18647	5037	9276	13216	3897	10514	17500	19033	26310	11352	2599	12532	10556	21147	9030	8646
Taxi	833	765	760	336	551	630	446	782	1432	912	2273	1384	346	699	552	1004	519	440
Mini Bus	563	435	512	131	237	378	135	453	699	437	896	551	255	603	182	492	338	227
KSRTC Bus AC	192	87	171	3	0	114	3	111	132	108	297	33	3	72	45	81	24	18
KSRTC Bus Non AC	3018	2631	3072	1161	36	2619	651	2391	2055	2565	4020	984	522	954	2010	126	543	1023
Pvt Bus AC	324	171	282	9	126	219	30	237	363	486	651	177	27	186	306	198	168	126
Pvt Bus NON AC	1068	507	900	906	180	423	354	159	1491	4074	3567	1719	396	2631	4467	960	2247	1884
School Bus	188	81	171	80	33	60	69	126	252	168	221	134	135	132	86	77	155	116
Others	12	9	3	15	177	0	9	0	3	126	264	42	0	81	75	306	105	144
2 wheelers	6171	5244	15999	6895	2643	4401	6255	8059	13447	7896	13926	8880	3263	8787	11265	9744	4977	4145
Auto Rickshaw	2008	2569	3683	1225	670	1170	2010	2164	2302	3343	3563	1754	1758	3663	3089	1998	2452	2178
Goods Auto	1435	1080	2038	671	101	1297	662	1058	2911	229	670	306	521	285	693	367	418	177
LCV	1896	1085	1877	441	1863	1260	377	639	3936	3035	11754	2738	372	2573	3177	5961	4266	2913
Truck	2007	1170	2217	420	1263	1758	360	639	5088	1566	6168	1413	906	165	1755	3174	3225	2691
MAV	2192	1112	3200	536	1107	2300	288	770	7506	2336	15246	2115	1490	140	1013	6795	4721	5324
Tractor Trailer	5	0	9	0	0	5	5	5	9	0	9	5	18	0	0	9	9	5
Others Goods	27	0	0	0	5	14	9	5	23	0	45	0	0	0	0	0	9	0
Passenger Vehicles	***31965***	***27472***	***44199***	***15797***	***13929***	***23230***	***13859***	***24996***	***39675***	***39147***	***55987***	***27009***	***9304***	***30340***	***32632***	***36133***	***20557***	***18946***
Freight Vehicles	***7561***	***4446***	***9340***	***2068***	***4339***	***6633***	***1700***	***3115***	***19473***	***7165***	***33892***	***6576***	***3307***	***3162***	***6638***	***16306***	***12648***	***11109***
Total Vehicles	**39526**	**31918**	**53539**	**17864**	**18267**	**29863**	**15559**	**28111**	**59148**	**46312**	**89879**	**33585**	**12611**	**33502**	**39269**	**52439**	**33205**	**30055**

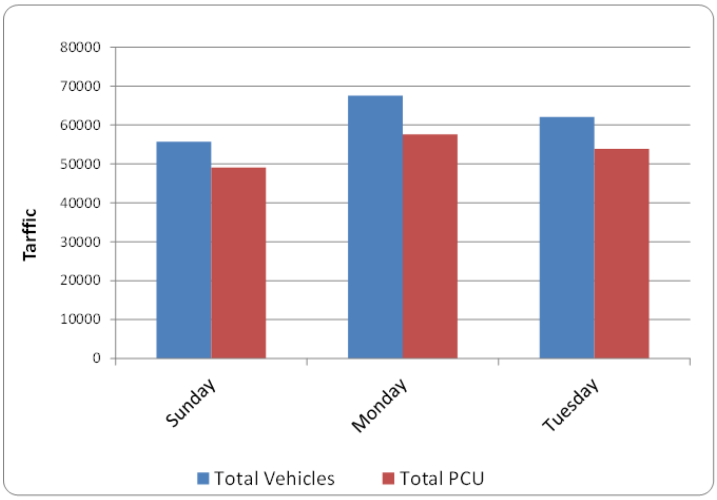
2.3.2. Daily Variation of Traffic

Daily variation of traffic is shown in Table 2.6 and Figure 2.1.

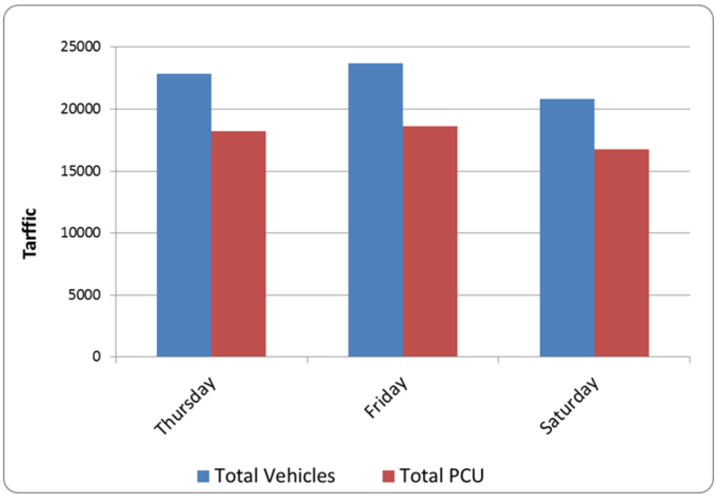
Table2.6: Daily Variation of Traffic

Location Number & Name	Maximum Traffic Day
TVC 01 Thottakadu	Friday
TVC 02 Kilimanoor	Friday
TVC 03 Karunagapally	Monday
TVC 04 Sasthacotta	Friday
TVC 05 Adoor Bypass	Monday
TVC 06 Enjhiljilam	Monday
TVC 07 Cherthala	Saturday
TVC 08 Udayamperoor	Sunday
TVC 09 Kumbalam Toll Plaza	Friday
TVC 10 Kumaranallor M C Road	Monday
TVC 11 Palliyekkara Toll Plaza	Saturday
TVC 12 Moothakunnam	Sunday
TVC 13 Gurupandapuri	Monday
TVC 14 Edappal	Sunday
TVC 15 Cheruvannur	Monday
TVC 16 Azhinjillam	Tuesday
TVC 17 Muzhapilangad	Saturday
TVC 18 Knhagad South	Saturday

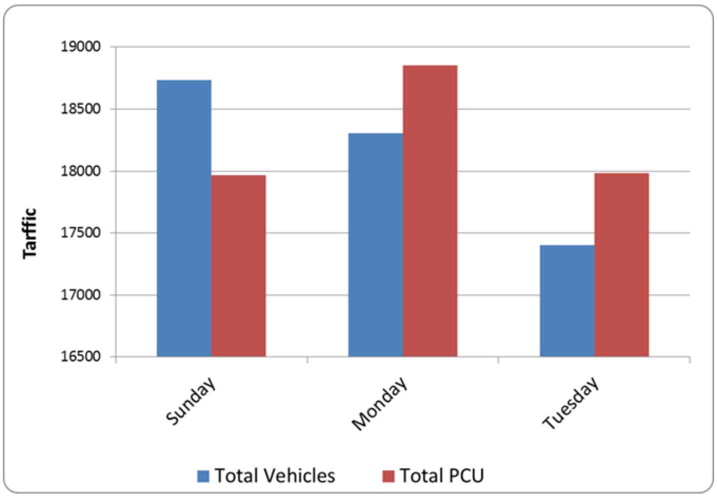
	
1. Thottakadu	2. Kilimanoor



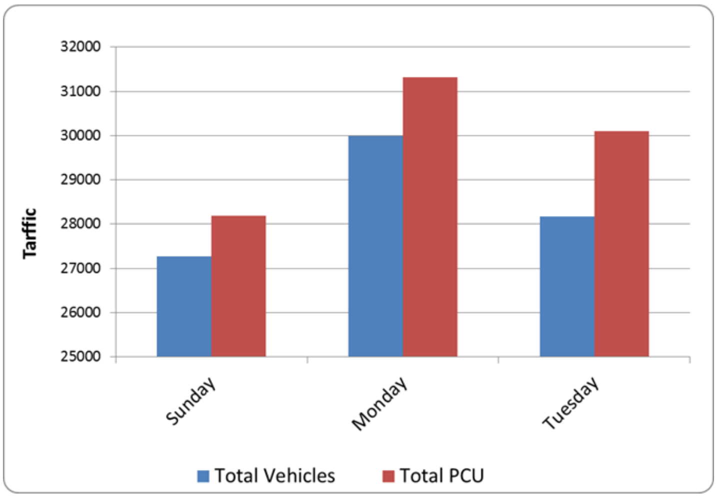
3. Karunagapally



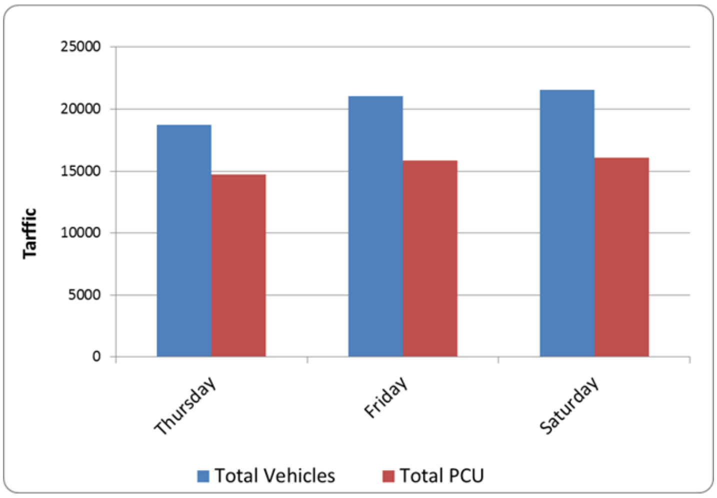
4. Sasthacotta



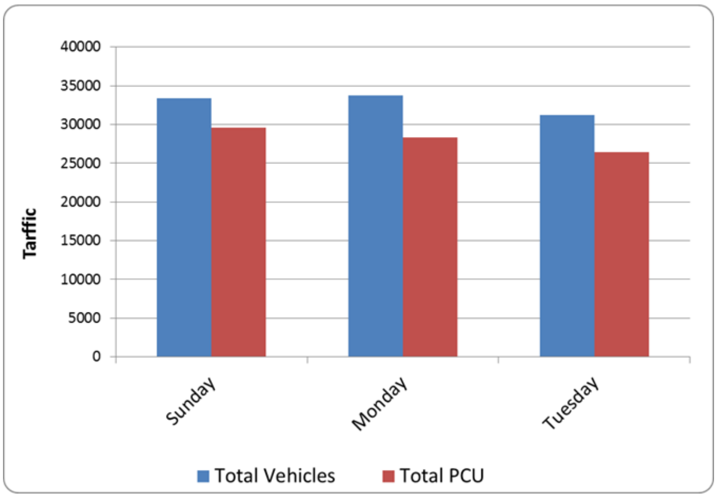
5. Adoor Bypass



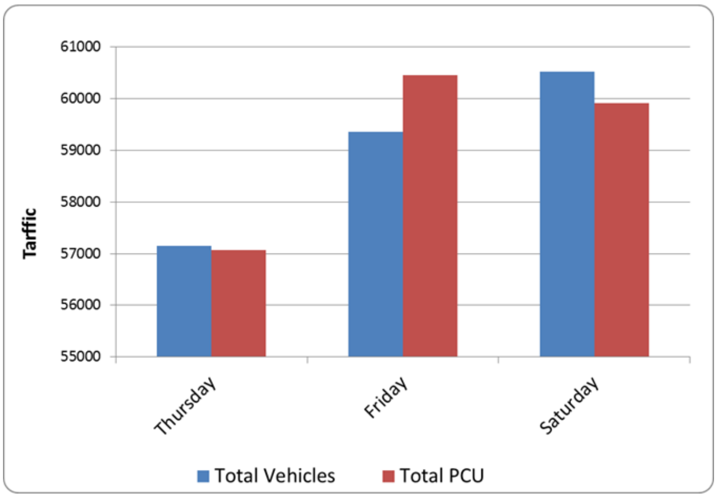
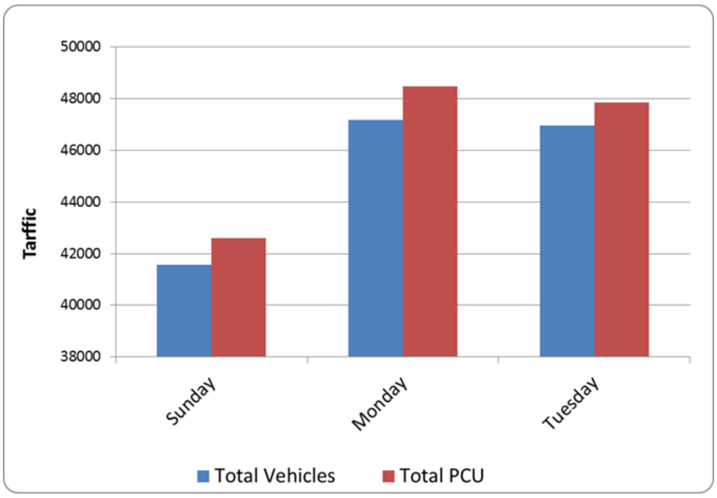
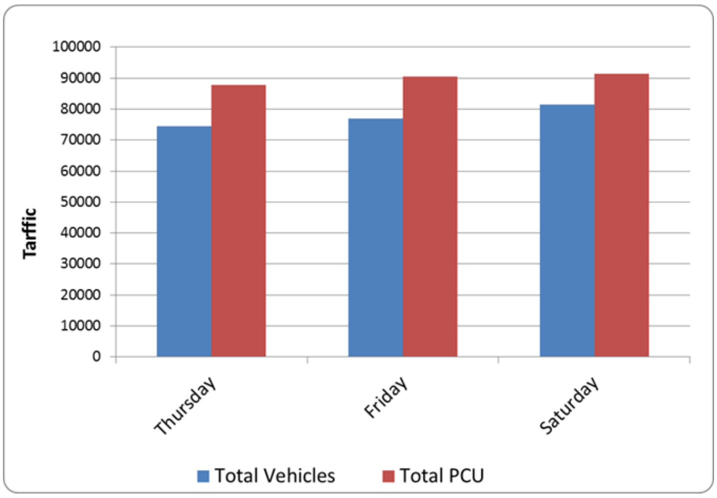
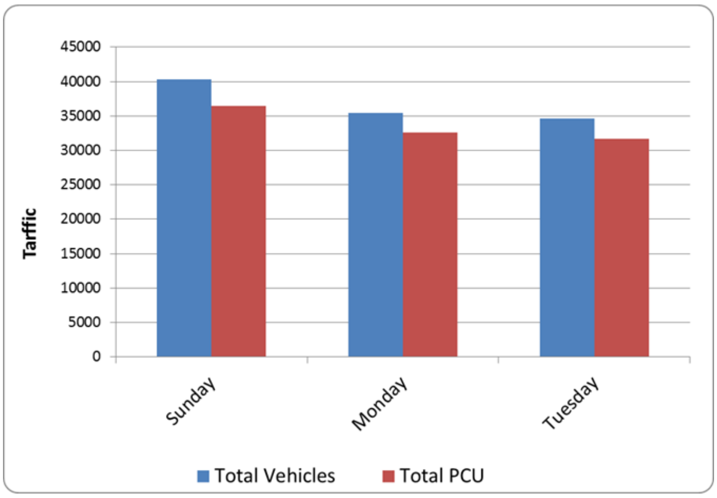
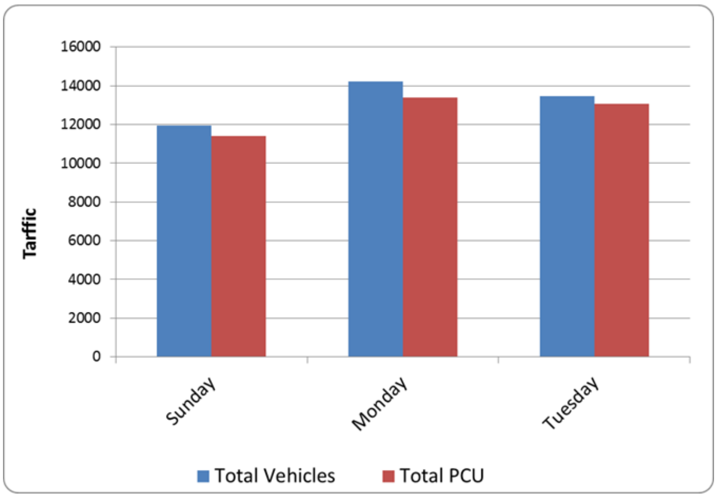
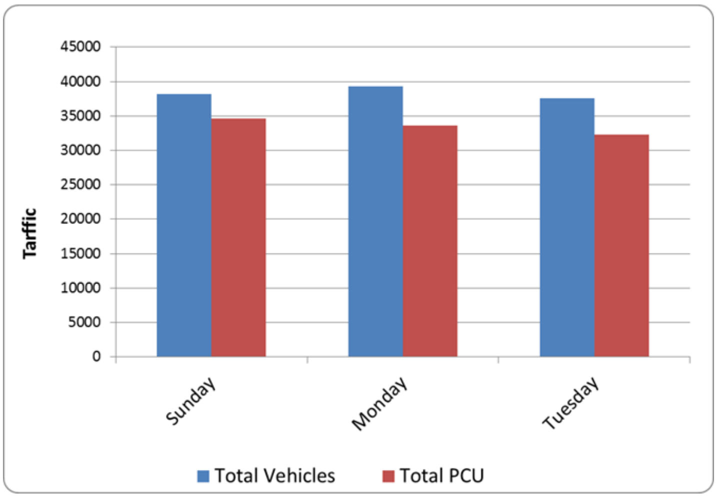
6. Enjhiljilam

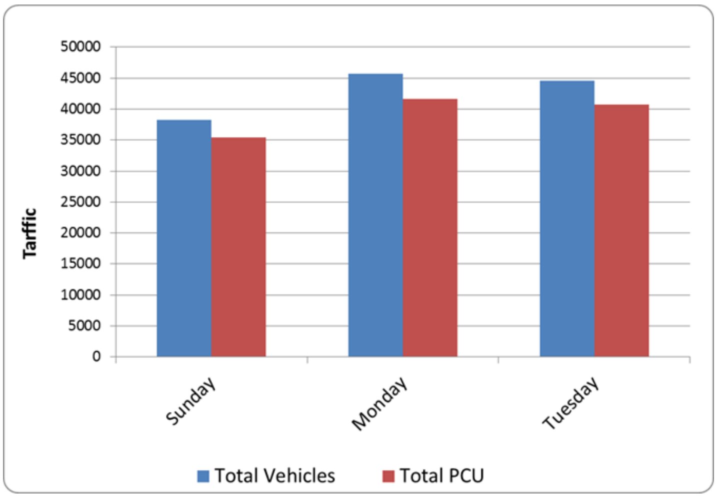


7. Cherthala

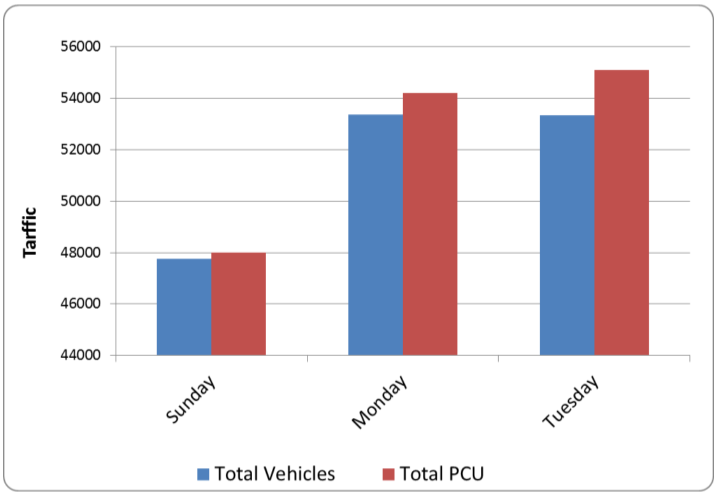


8. Udayamperoor

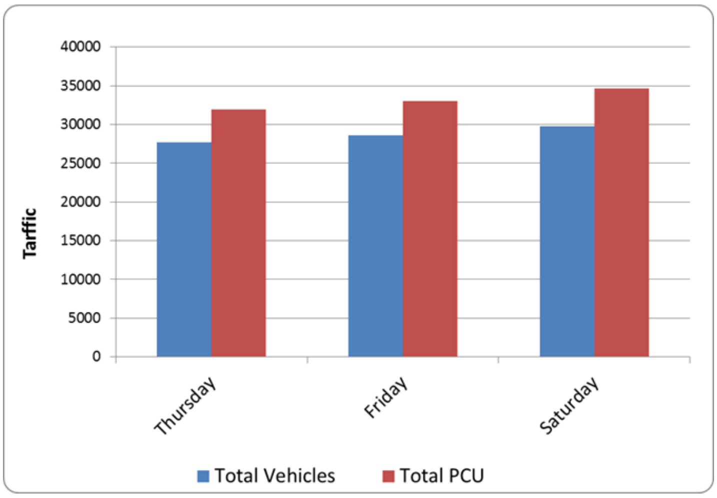
	
9. Kumbalam Toll Plaza	10. Kumaranallor M C Road
	
11. Palliyekkara Toll Plaza	12. Moothakunnam
	
13. Gurupandapuri	14. Edappal



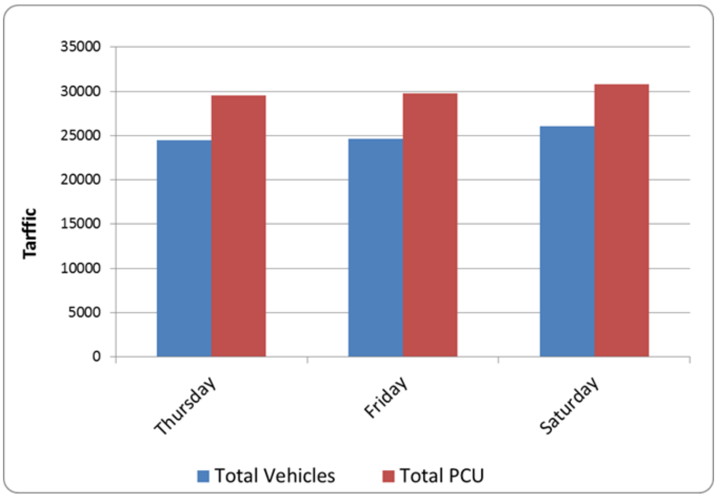
15. Cheruvannur



16. Azhinjillam



17. Muzhapilangad



18. Knhagad South

Figure2.1: Daily Traffic Variation

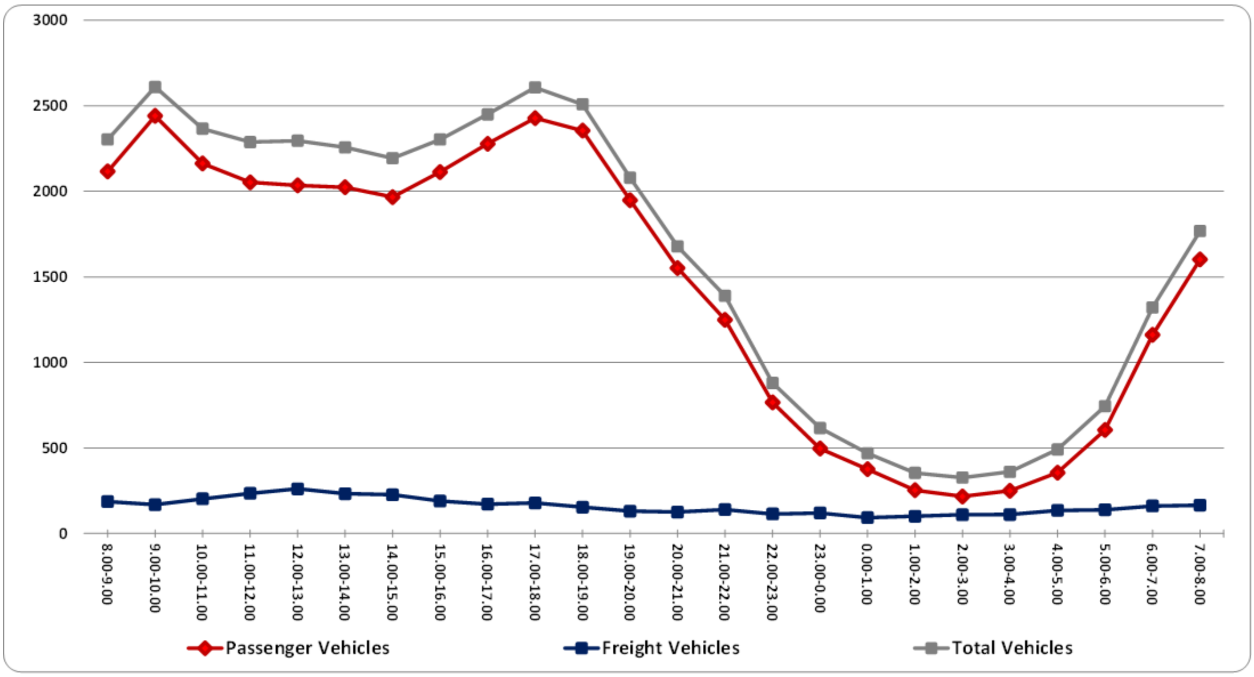
2.3.3. Hourly Variation of Traffic

The hourly variation of traffic has been estimated by averaging the hourly counts over the period of the 3 days counts at 19 locations. The hourly volume obtained over the period of survey has been averaged to obtain the average hourly variation of traffic is shown in Table 2.7 and Figure 2.2.

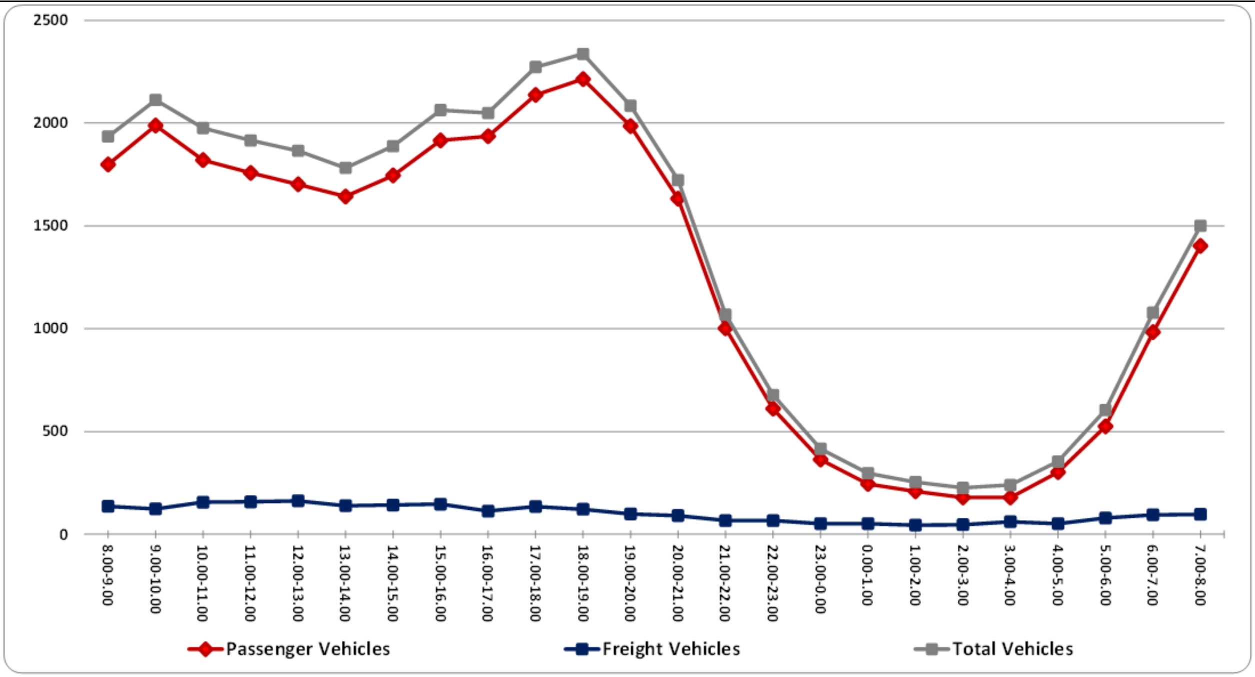
Table2.7: Hourly Variation of Traffic

Location Number & Name	Morning Peak Hour	Evening Peak Hour
TVC 01 Thottakadu	9.00-10.00	17.00-18.00
TVC 02 Kilimanoor	9.00-10.00	18.00-19.00
TVC 03 Karunagapally	10.00-11.00	17.00-18.00
TVC 04 Sasthacotta	11.00-12.00	18.00-19.00

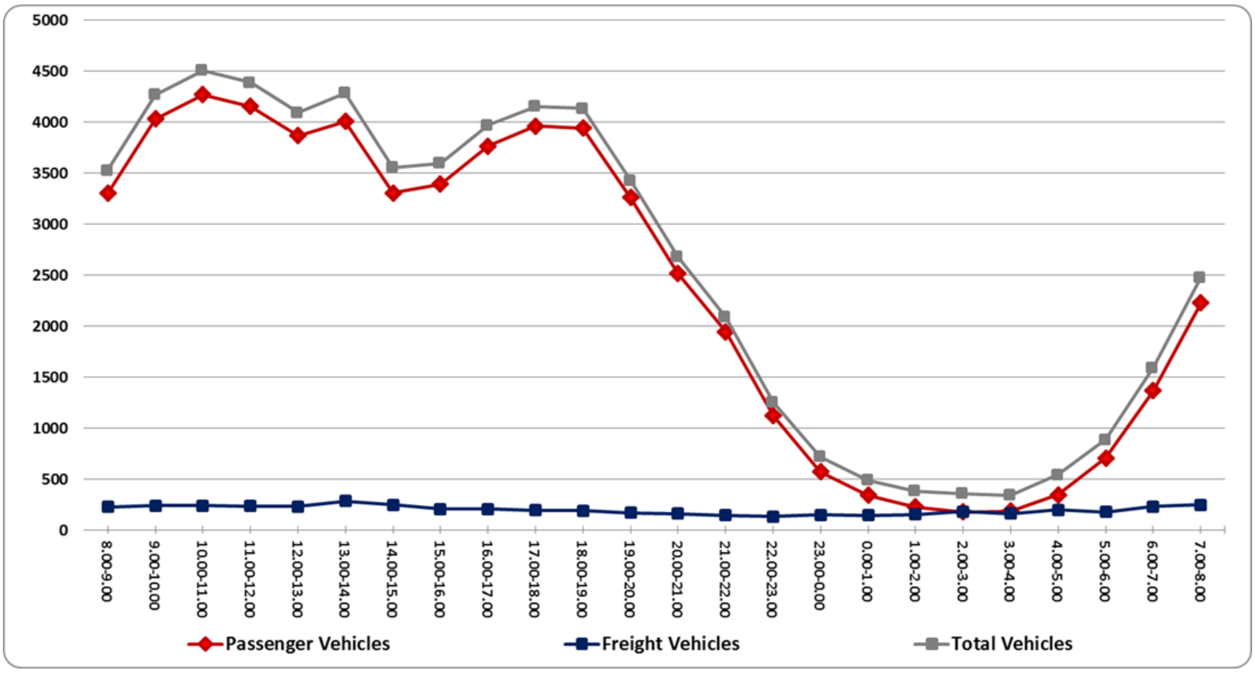
Location Number & Name	Morning Peak Hour	Evening Peak Hour
TVC 05 Adoor Bypass	10.00-11.00	17.00-18.00
TVC 06 Enjhiljilam	9.00-10.00	17.00-18.00
TVC 07 Cherthala	11.00-12.00	18.00-19.00
TVC 08 Udayamperoor	8.00-9.00	17.00-18.00
TVC 09 Kumbalam Toll Plaza	8.00-9.00	18.00-19.00
TVC 10 Kumaranallor M C Road	9.00-10.00	17.00-18.00
TVC 11 Palliyekkara Toll Plaza	9.00-10.00	18.00-19.00
TVC 12 Moothakunnam	9.00-10.00	17.00-18.00
TVC 13 Gurupandapuri	12.00-13.00	17.00-18.00
TVC 14 Edappal	9.00-10.00	17.00-18.00
TVC 15 Cheruvannur	10.00-11.00	17.00-18.00
TVC 16 Azhinjillam	9.00-10.00	17.00-18.00
TVC 17 Muzhapilangad	9.00-10.00	17.00-18.00
TVC 18 Knhagad South	9.00-10.00	17.00-18.00



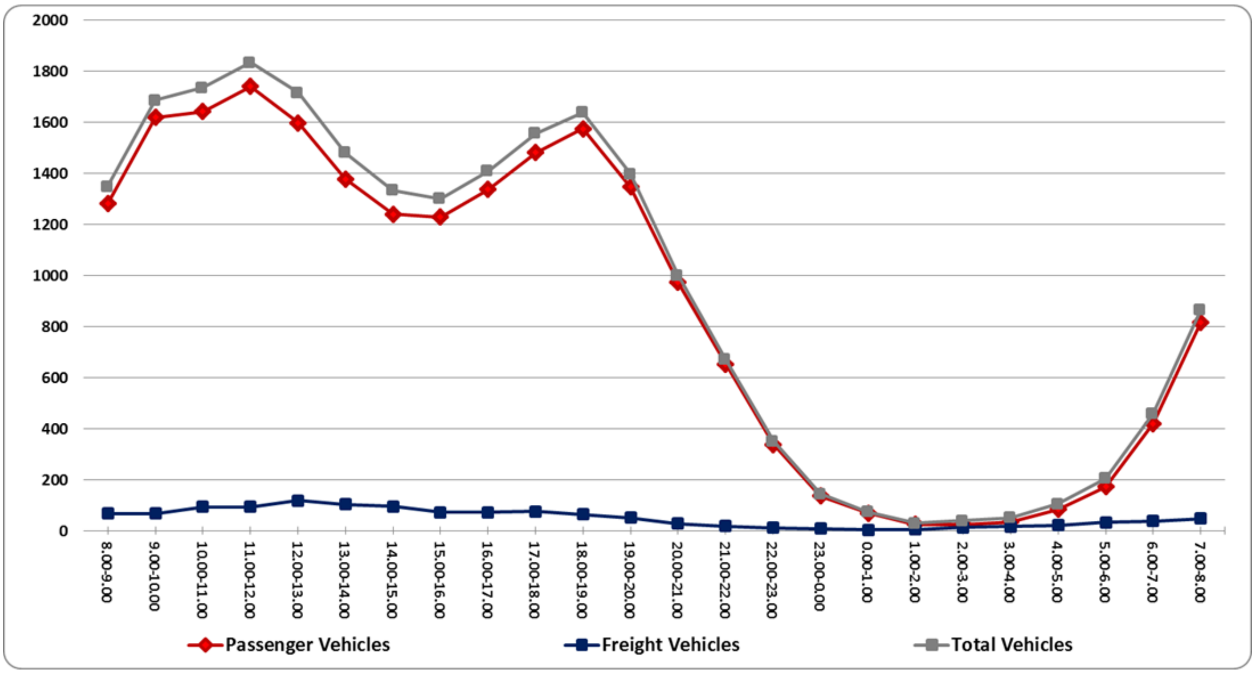
1. Thottakadu



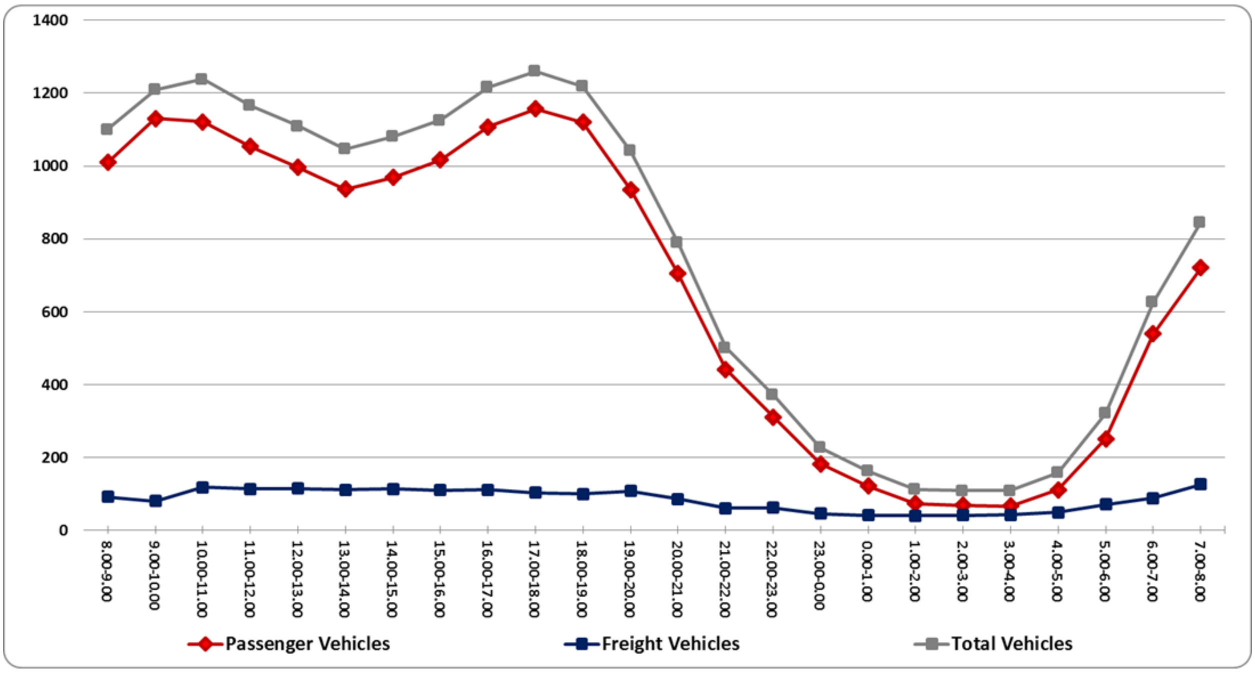
2. Kilimanoor



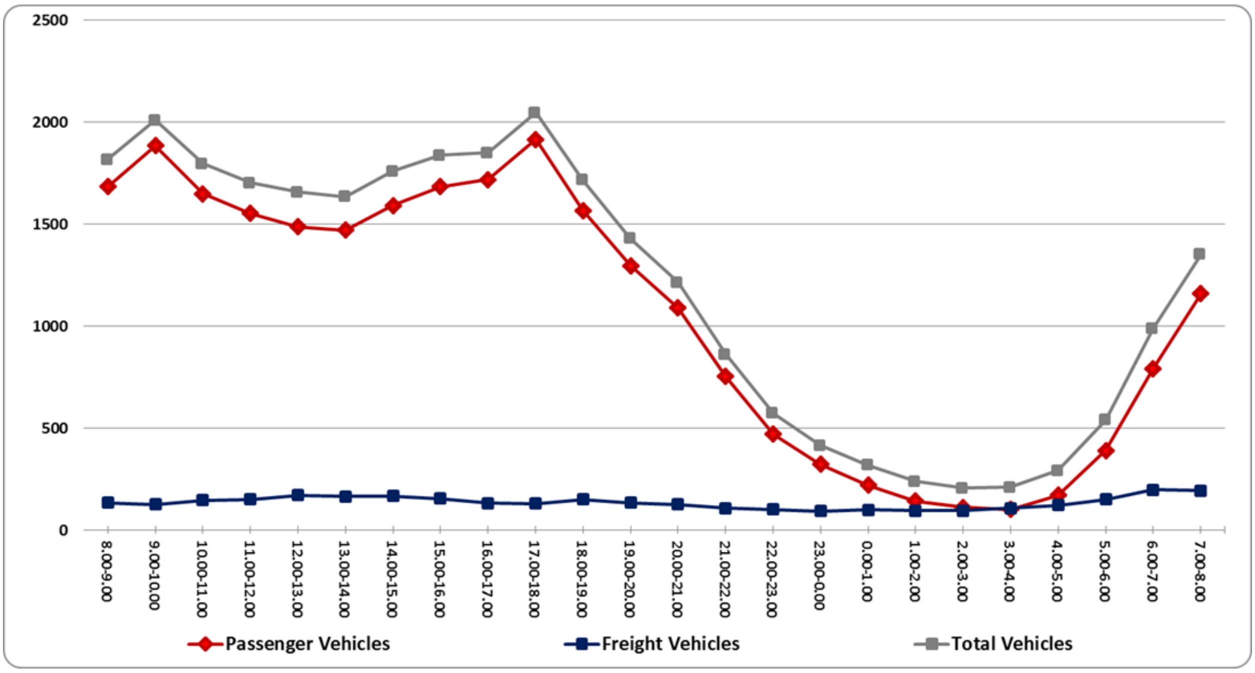
3. Karunagapally



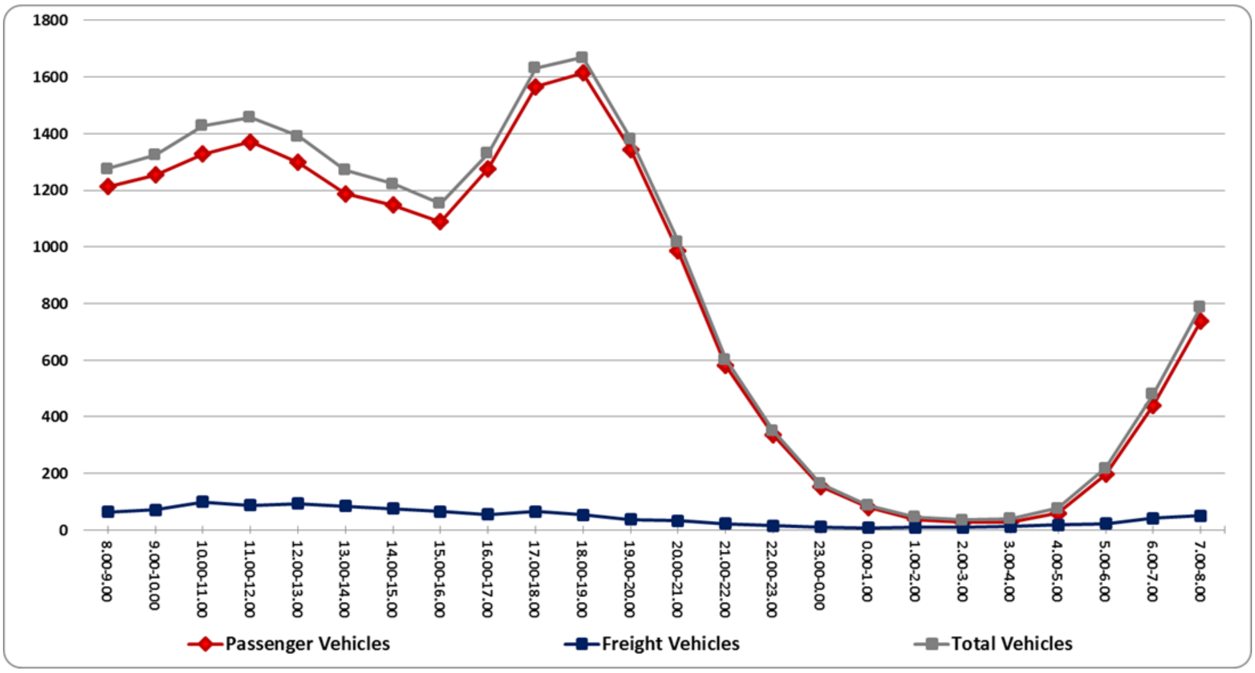
4. Sasthacotta



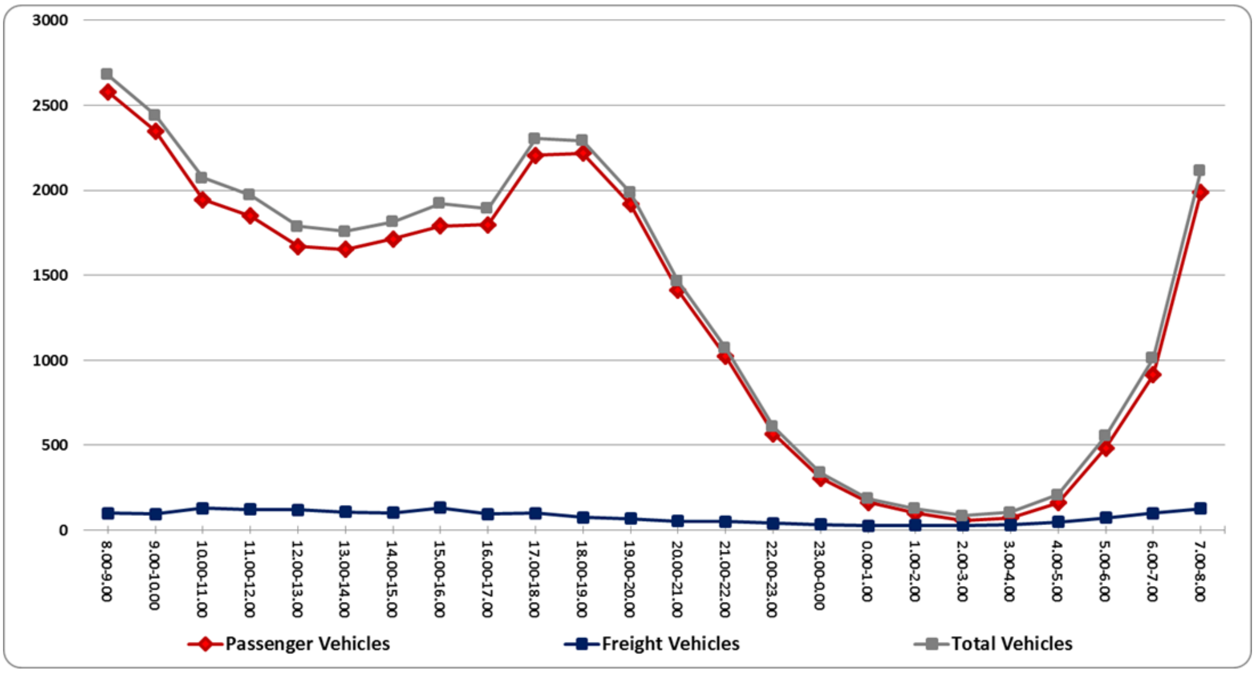
5. Adoor Bypass



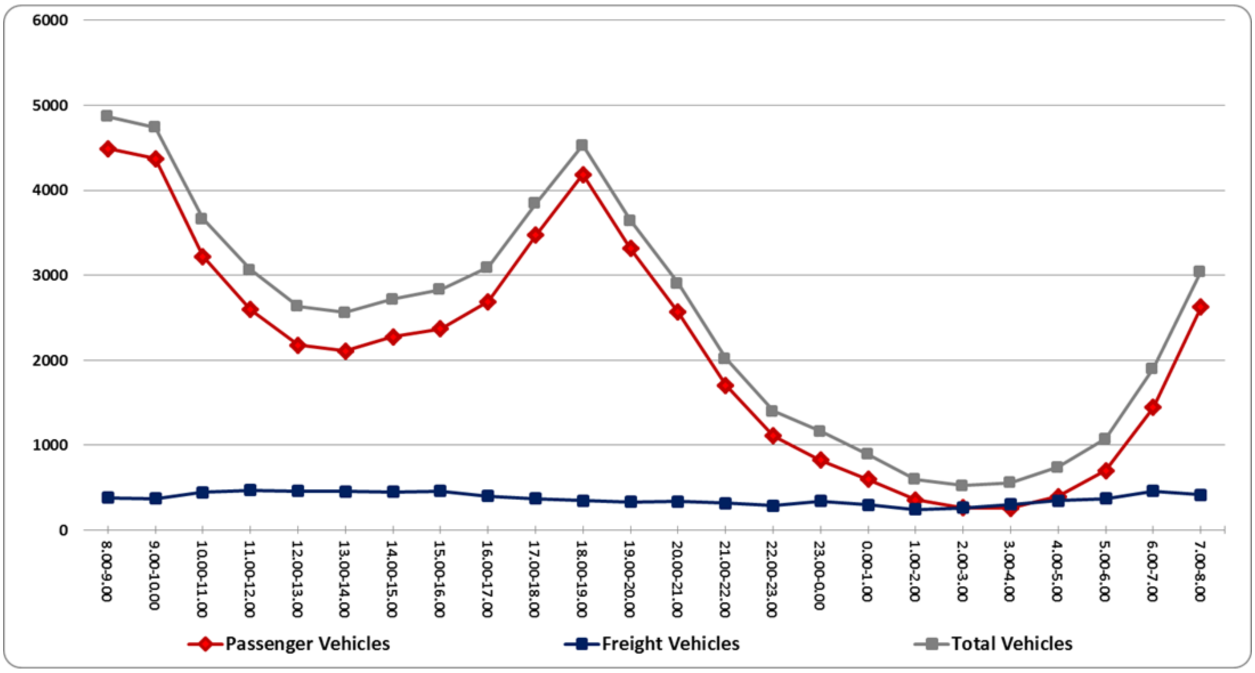
6. Enjhiljilam



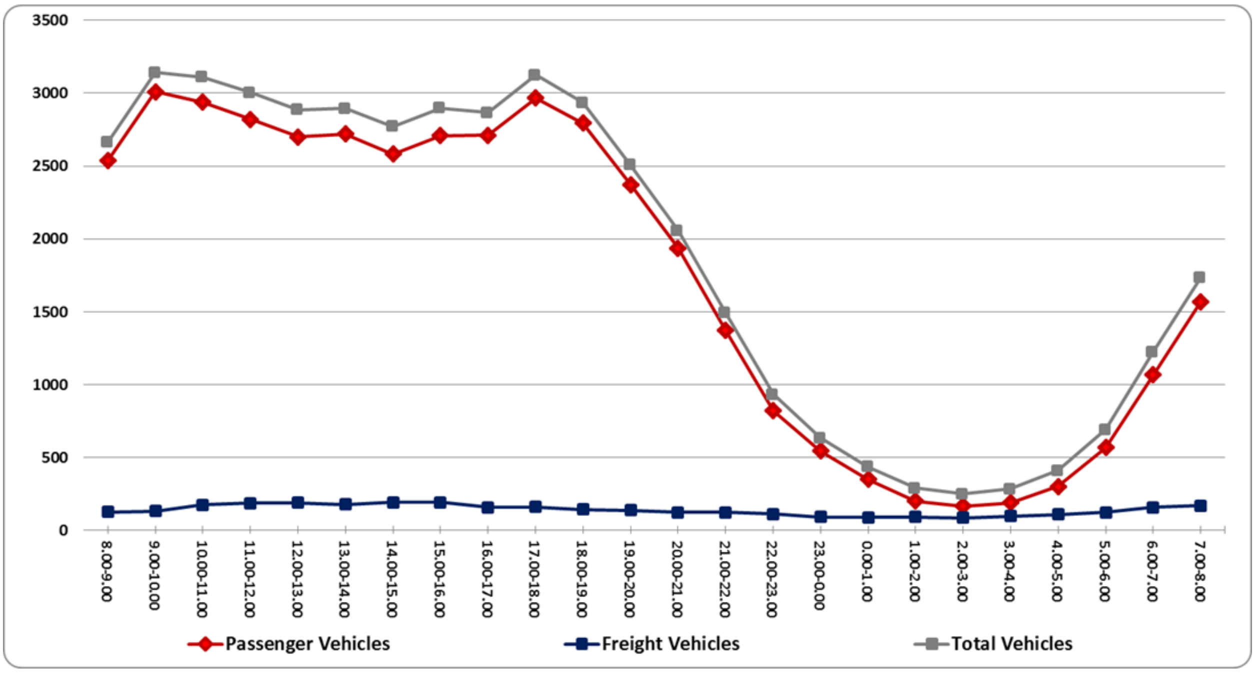
7. Cherthala



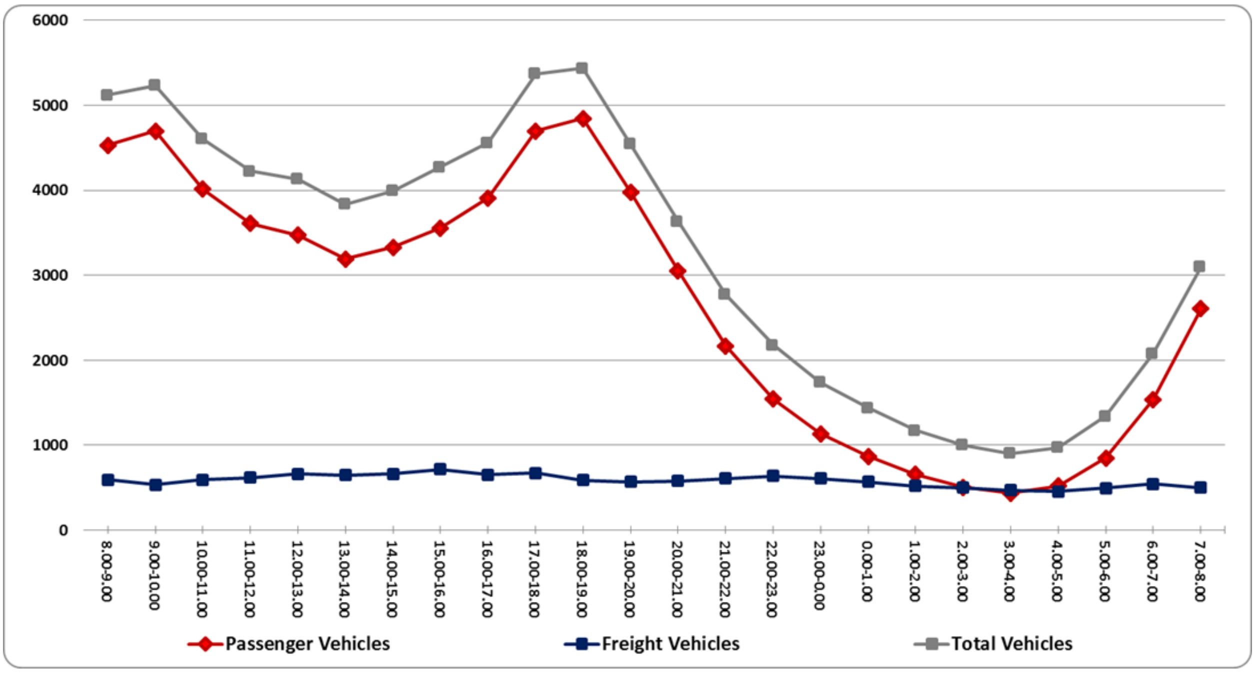
8. Udayamperoor



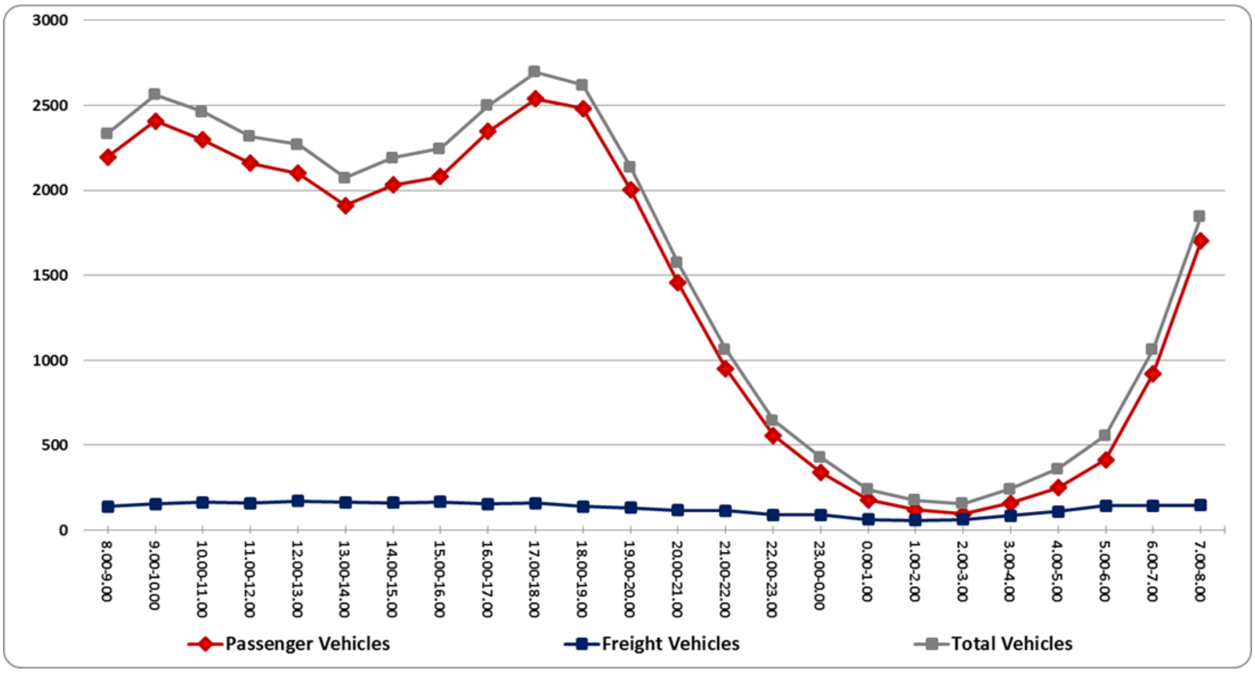
9. Kumbalam Toll Plaza



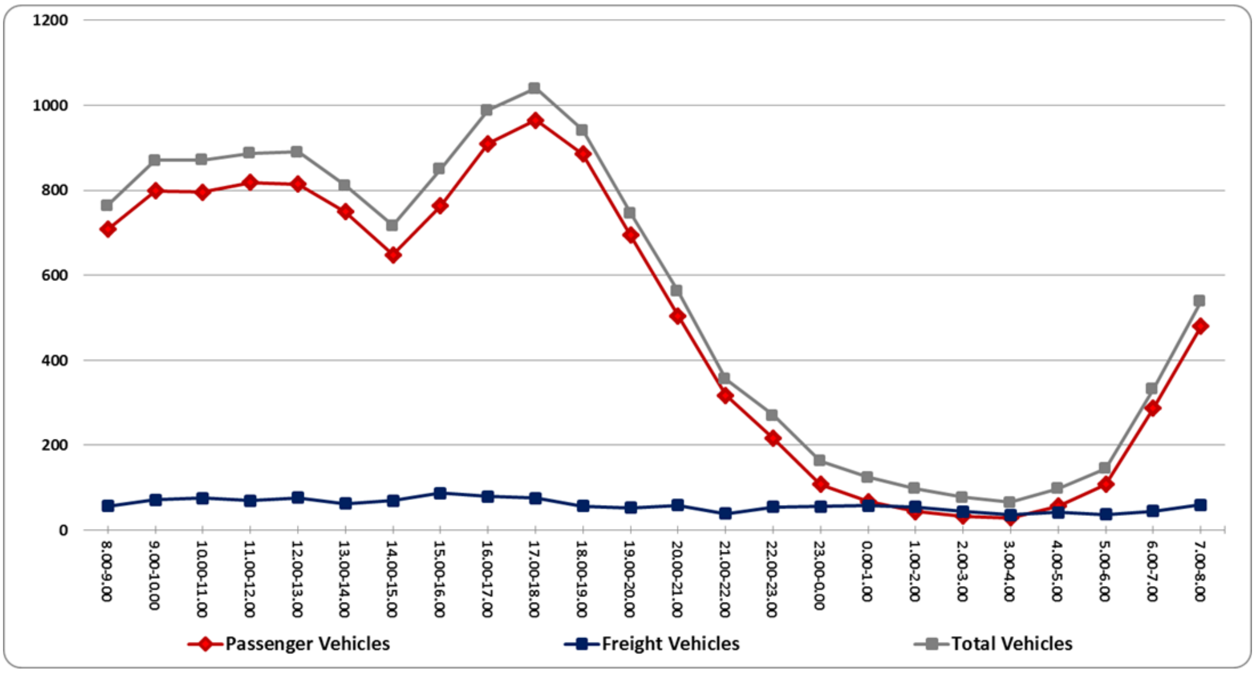
10. Kumaranallor M C Road



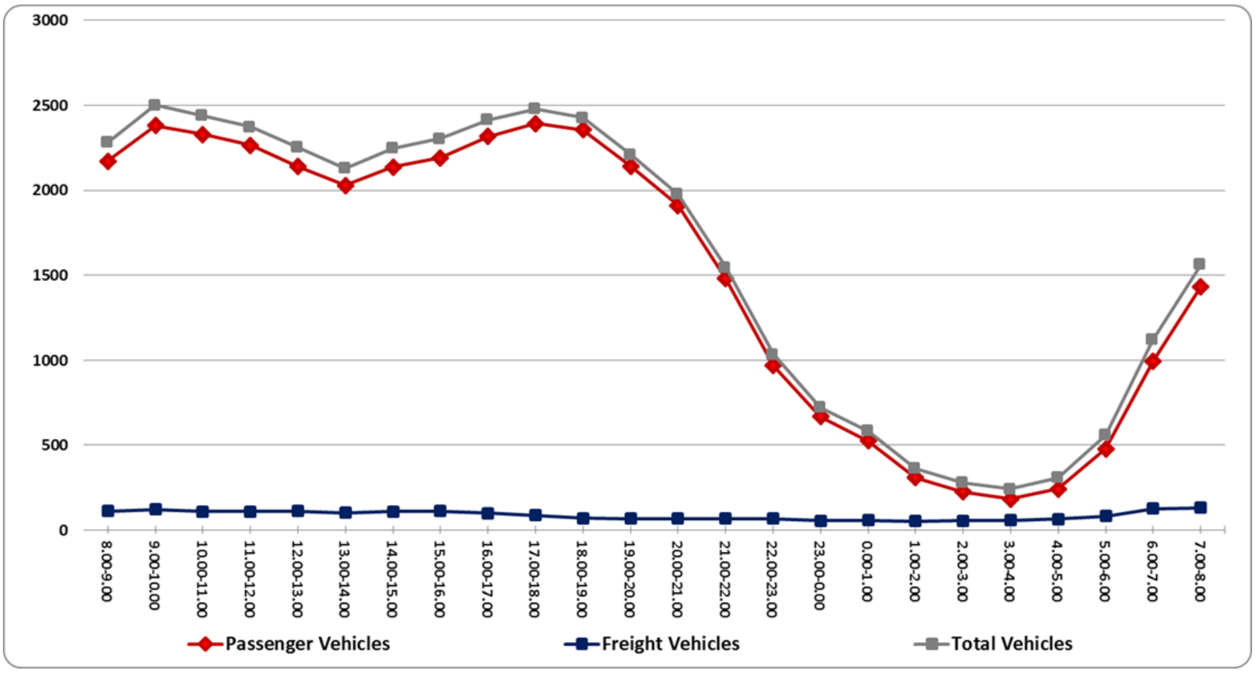
11. Palliyekkara Toll Plaza



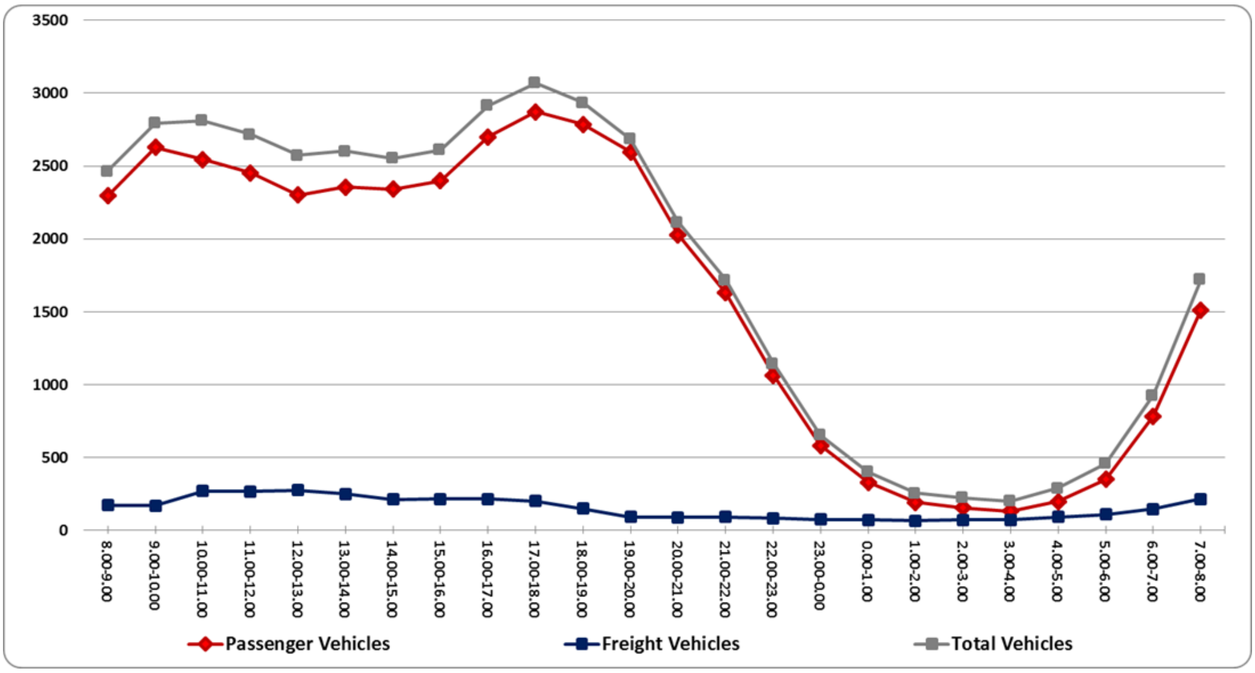
12. Moothakunnam



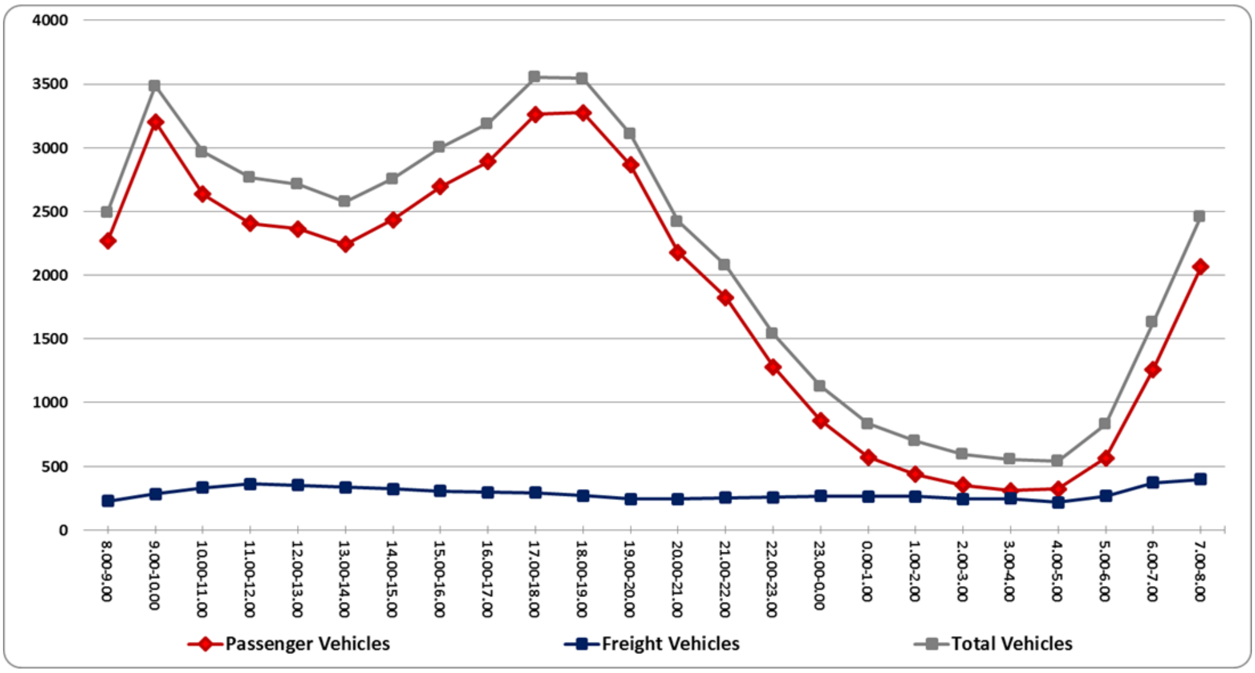
13. Gurupandapuri



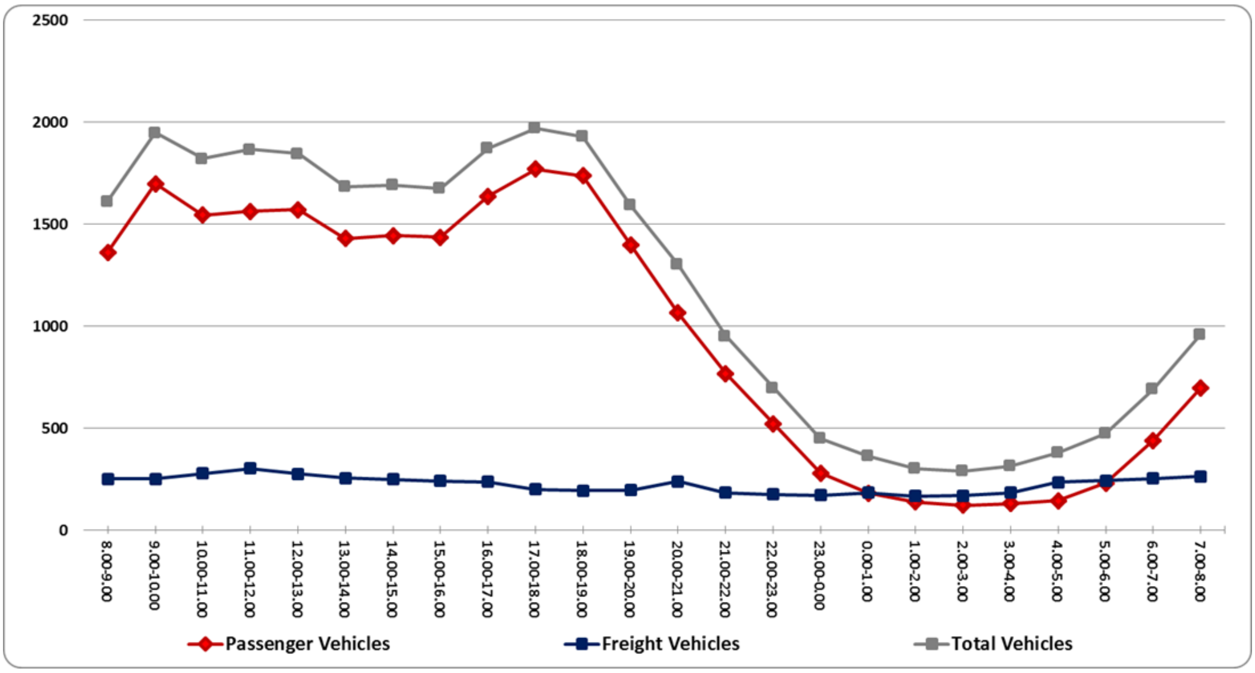
14. Edappal



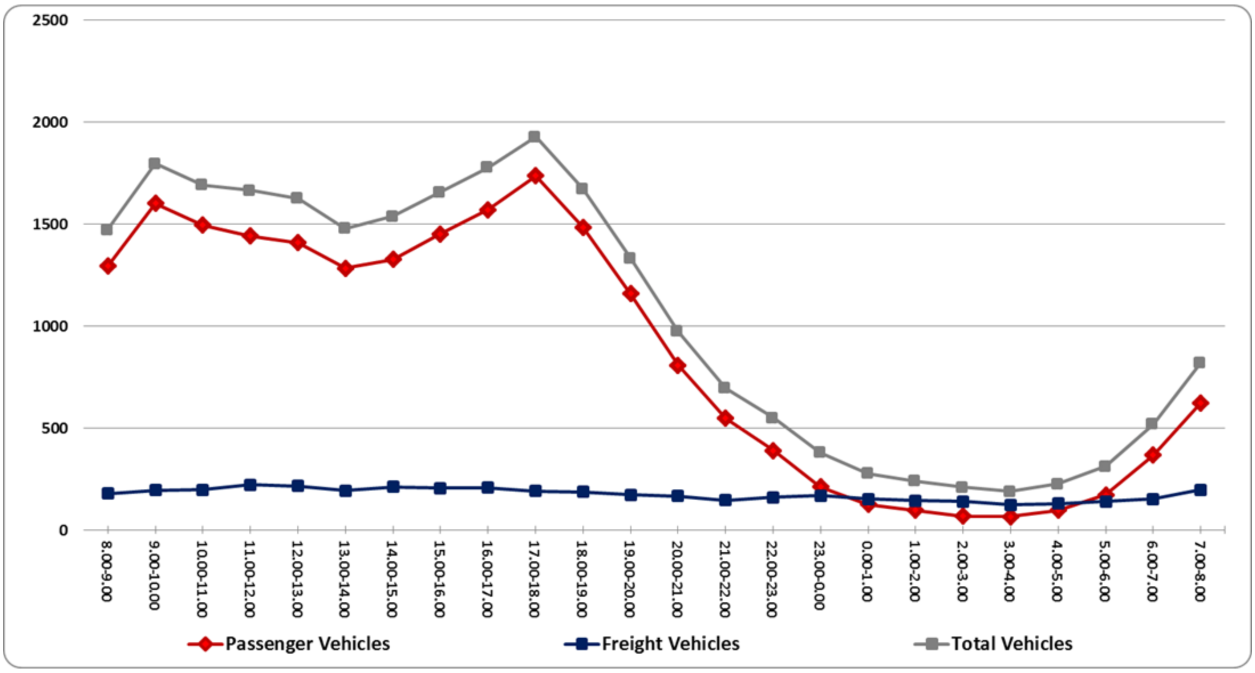
15. Cheruvannur



16. Azhinjillam



17. Muzhapilangad



18. Knhagad South

Figure2.2: Hourly Traffic Variation

2.3.4. Directional Distribution

The Directional Distribution of Traffic is shown in Table 2.8.

Table2.8: Directional Distribution of Traffic

Location Number & Name	UP	Down
TVC 01 Thottakadu	49.42%	50.58%
TVC 02 Kilimanoor	52.63%	47.37%
TVC 03 Karunagapally	49.00%	51.00%
TVC 04 Sasthacotta	49.47%	50.53%
TVC 05 Adoor Bypass	48.22%	51.78%
TVC 06 Enjhiljilam	51.04%	48.96%
TVC 07 Cherthala	49.32%	50.68%
TVC 08 Udayamperoor	47.93%	52.07%
TVC 09 Kumbalam Toll Plaza	50.03%	49.97%
TVC 10 Kumaranallor M C Road	49.13%	50.87%
TVC 11 Palliyekkara Toll Plaza	50.00%	50.00%
TVC 12 Moothakunnam	48.82%	51.18%
TVC 13 Gurupandapuri	51.23%	48.77%
TVC 14 Edappal	51.24%	48.76%
TVC 15 Cheruvannur	50.33%	49.67%
TVC 16 Azhinjillam	49.61%	50.39%
TVC 17 Muzhapilangad	50.03%	49.97%
TVC 18 Knhagad South	50.87%	49.13%

2.3.5. Peak Hour Traffic

The Peak Hour Traffic details are shown in Table 2.9.

Table2.9: Peak Hour Details of Traffic

Location Number & Name	Peak Hour Factor	Peak Hour (%)	Peak Hour PCU
TVC 01 Thottakadu	6.27%	17.00-18.00	2478
TVC 02 Kilimanoor	6.67%	17.00-18.00	2128
TVC 03 Karunagapally	6.70%	10.00-11.00	3586
TVC 04 Sasthacotta	8.10%	11.00-12.00	1446
TVC 05 Adoor Bypass	6.62%	10.00-11.00	1209
TVC 06 Enjhiljilam	6.29%	17.00-18.00	1880
TVC 07 Cherthala	7.51%	18.00-19.00	1169
TVC 08 Udayamperoor	7.34%	8.00-9.00	2062
TVC 09 Kumbalam Toll Plaza	6.55%	8.00-9.00	3875
TVC 10 Kumaranallor M C Road	6.66%	10.00-11.00	3083
TVC 11 Palliyekkara Toll Plaza	5.93%	17.00-18.00	5328
TVC 12 Moothakunnam	6.84%	17.00-18.00	2297
TVC 13 Gurupandapuri	7.19%	16.00-17.00	906
TVC 14 Edappal	6.23%	9.00-10.00	2087
TVC 15 Cheruvannur	6.71%	17.00-18.00	2634
TVC 16 Azhinjillam	6.02%	17.00-18.00	3159
TVC 17 Muzhapilangad	5.81%	11.00-12.00	1928
TVC 18 Knhagad South	6.56%	17.00-18.00	1971

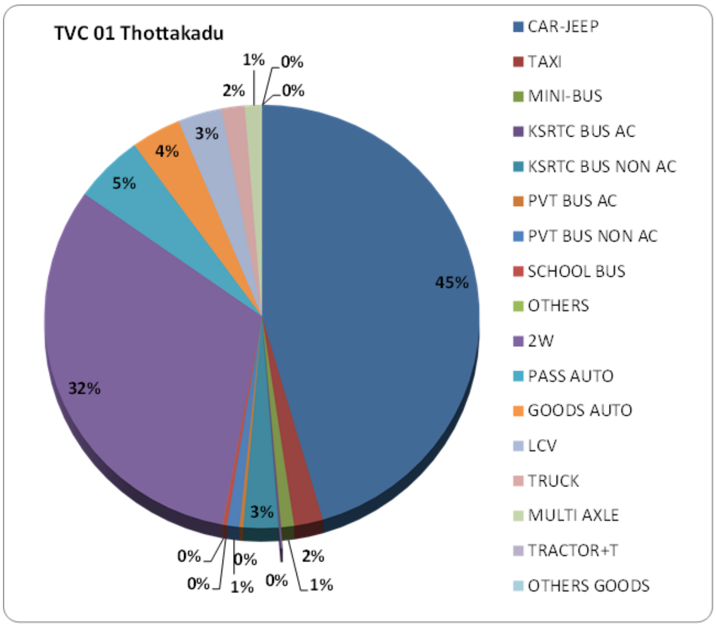
2.3.6. Traffic Composition

Mode wise distribution of the traffic along the project road is shown below in the table 2.10 and shown graphically in Figures 2.3.

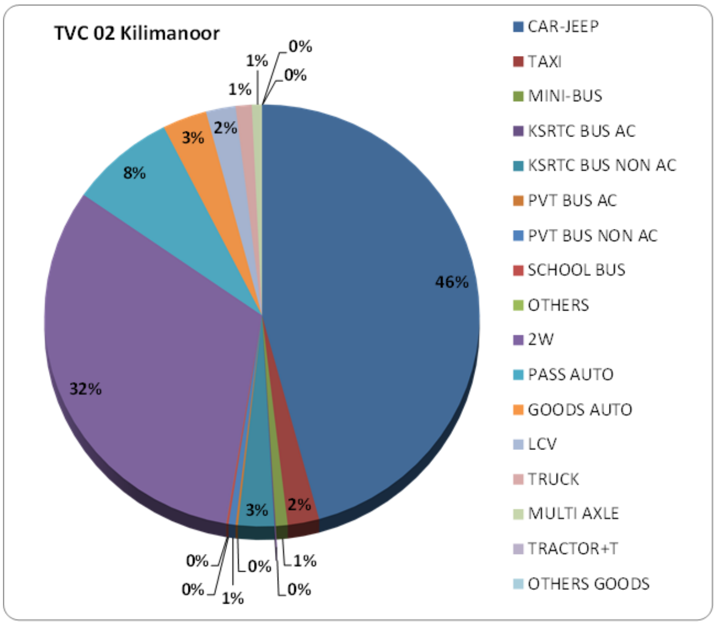
Table2.10: Composition of Traffic

Vehicle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Car, Jeep, Van	45%	46%	30%	22%	51%	46%	19%	32%	30%	42%	34%	31%	20%	33%	25%	41%	31%	35%
Taxi	2%	2%	1%	1%	3%	2%	2%	2%	2%	2%	3%	4%	3%	2%	1%	2%	2%	2%
Mini Bus	1%	1%	1%	0%	1%	1%	0%	1%	1%	1%	1%	1%	1%	1%	0%	1%	1%	1%
KSRTC Bus AC	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
KSRTC Bus Non AC	3%	3%	2%	2%	0%	3%	1%	2%	1%	2%	2%	1%	1%	1%	2%	0%	1%	1%
Pvt Bus AC	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pvt Bus NON AC	1%	1%	0%	1%	0%	0%	1%	0%	1%	3%	2%	2%	1%	2%	3%	1%	3%	3%
School Bus	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Others	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2 wheelers	32%	32%	52%	61%	29%	31%	61%	49%	46%	35%	36%	48%	49%	46%	53%	38%	35%	33%
Auto Rickshaw	5%	8%	6%	5%	4%	4%	10%	7%	4%	7%	5%	5%	13%	10%	7%	4%	9%	9%
Goods Auto	4%	3%	3%	3%	1%	5%	3%	3%	5%	1%	1%	1%	4%	1%	2%	1%	1%	1%
LCV	3%	2%	2%	1%	7%	3%	1%	1%	4%	4%	10%	5%	2%	4%	5%	8%	10%	8%
Truck	2%	1%	1%	1%	2%	2%	1%	1%	3%	1%	3%	1%	2%	0%	1%	2%	4%	4%
MAV	1%	1%	1%	1%	1%	2%	0%	1%	3%	1%	4%	1%	3%	0%	1%	3%	4%	5%

Vehicle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Tractor Trailer	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Others Goods	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**



1. Thottakadu



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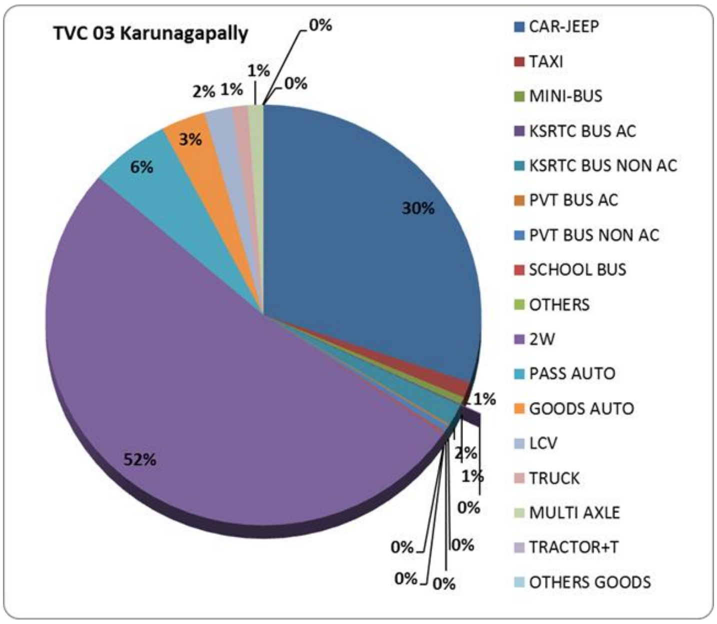
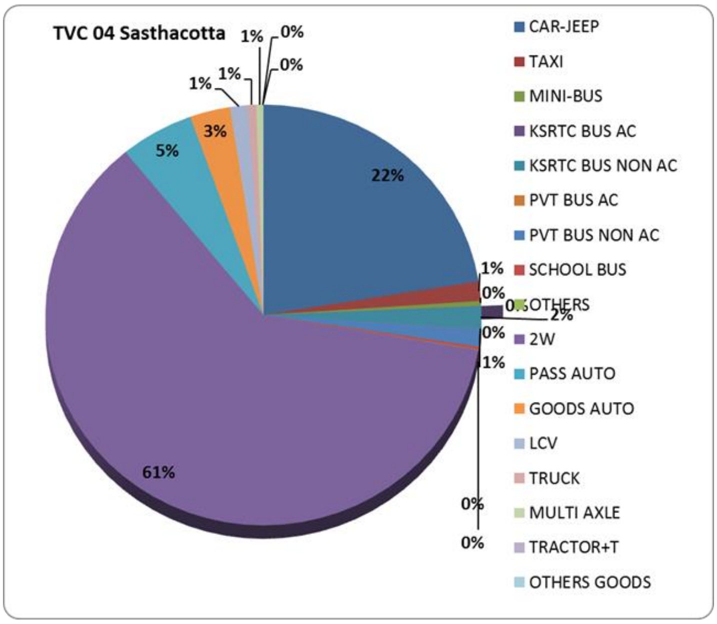
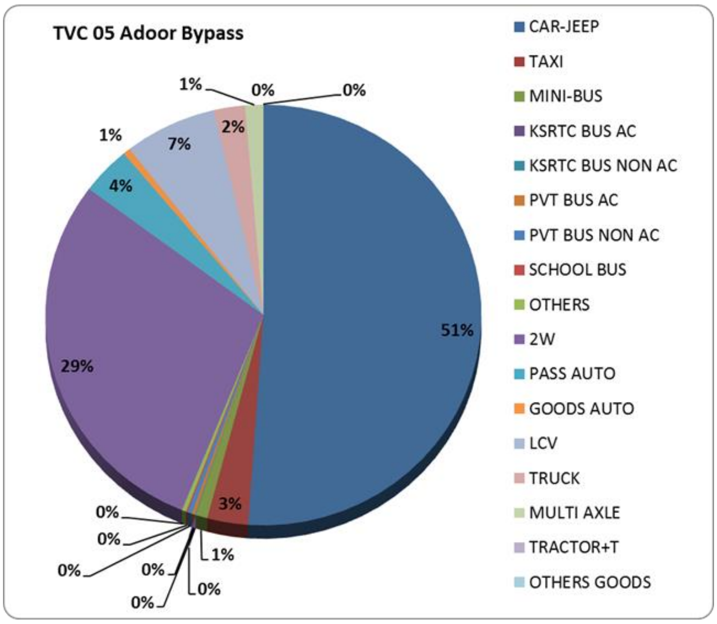
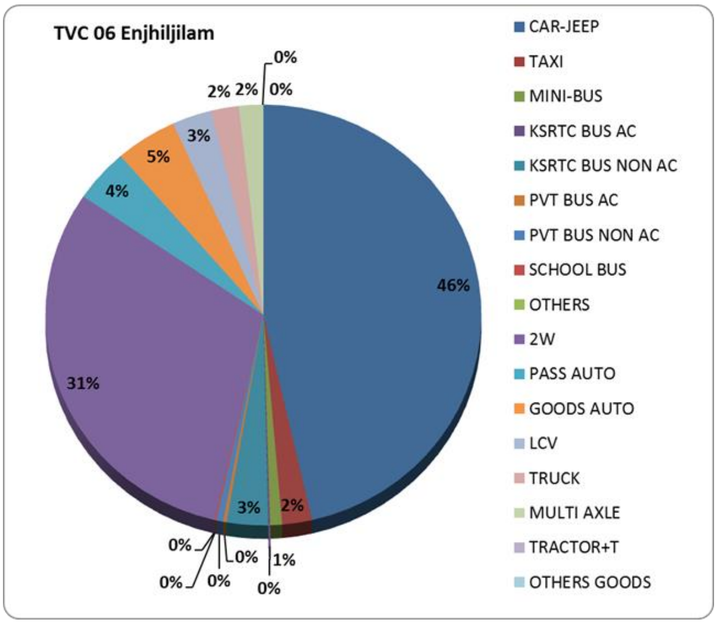


3. Karunagapally



4. Sasthacotta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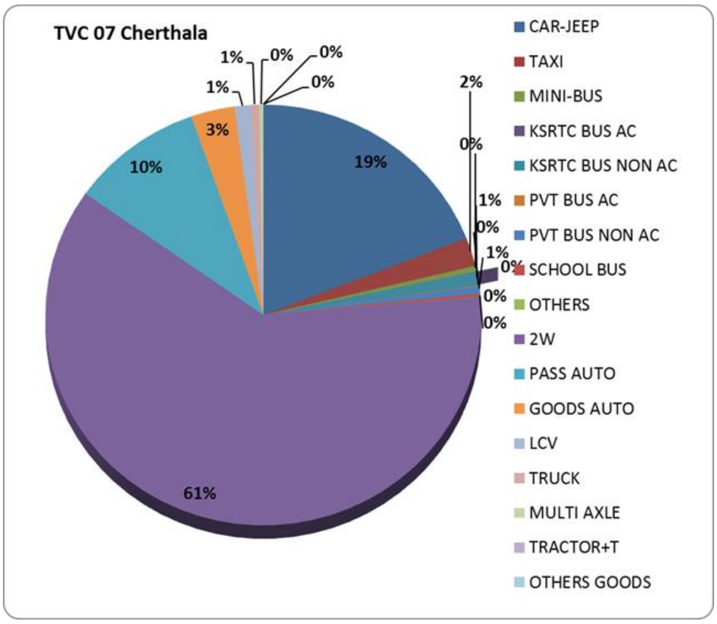
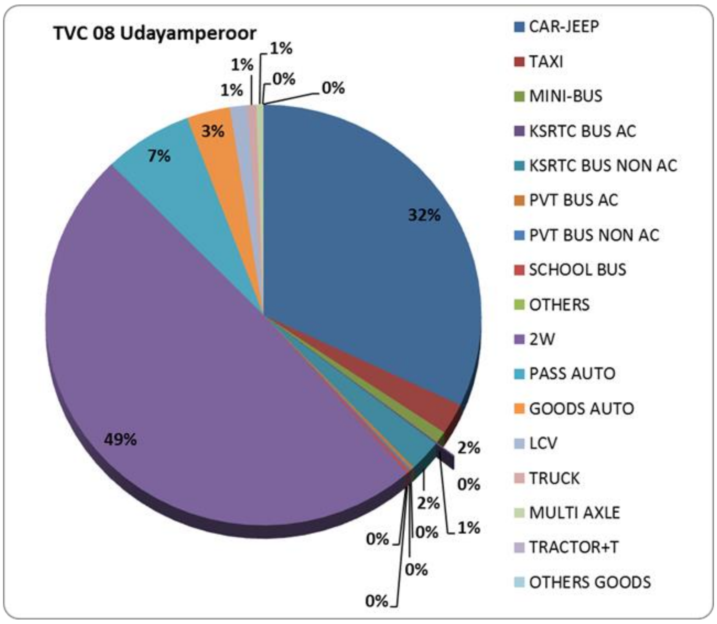
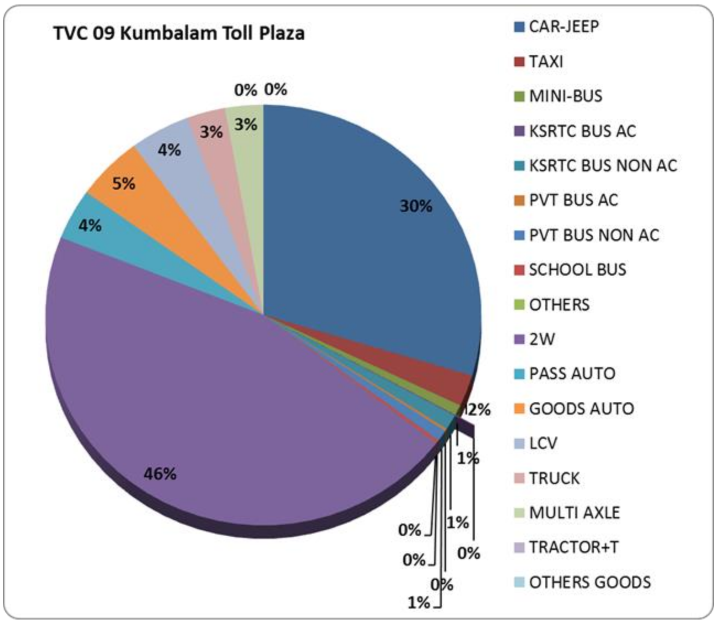
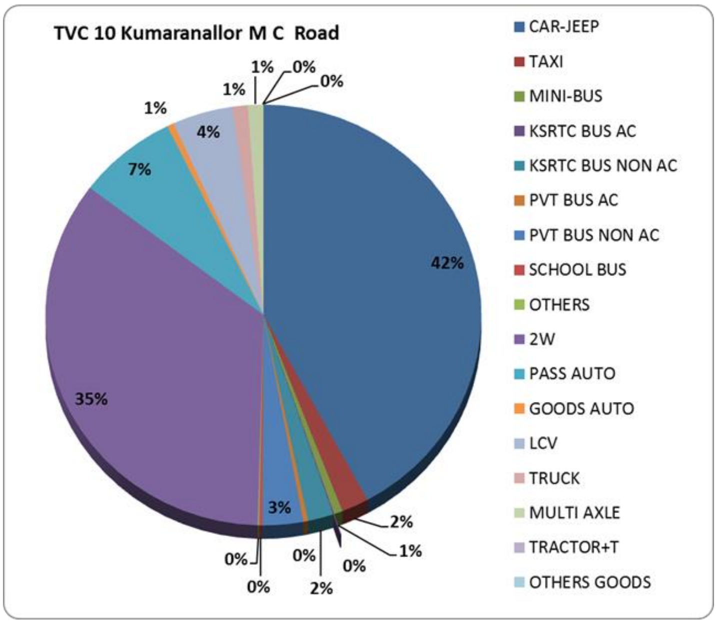
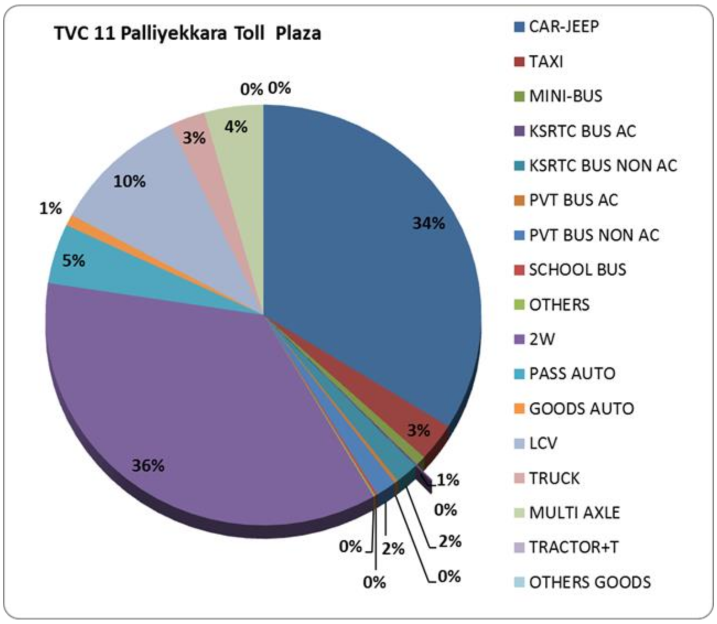
	
7. Cherthala	8. Udayamperoor



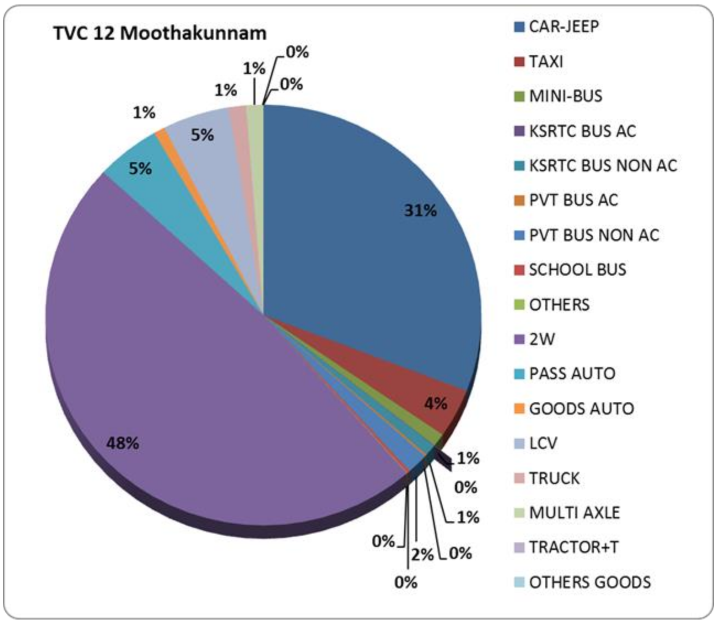
9. Kumbalam Toll Plaza



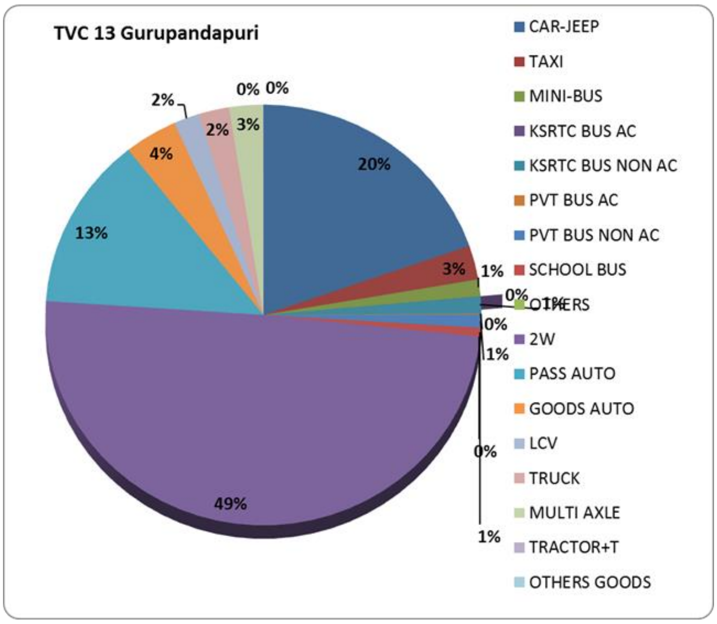
10. Kumaranallor M C Road



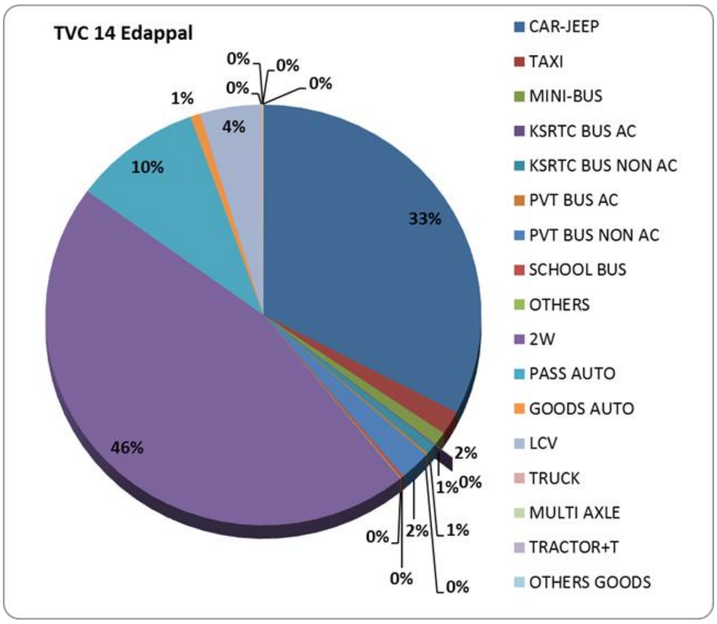
11. Palliyekkara Toll Plaza



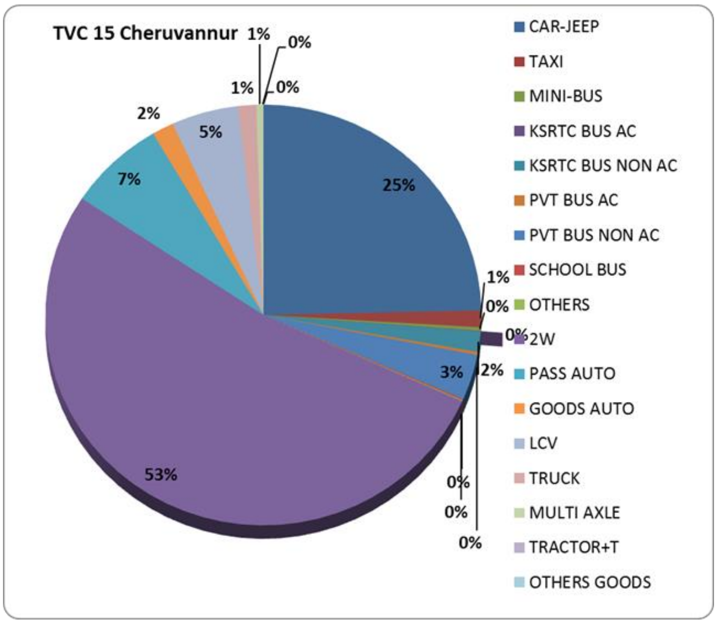
12. Moothakunnam



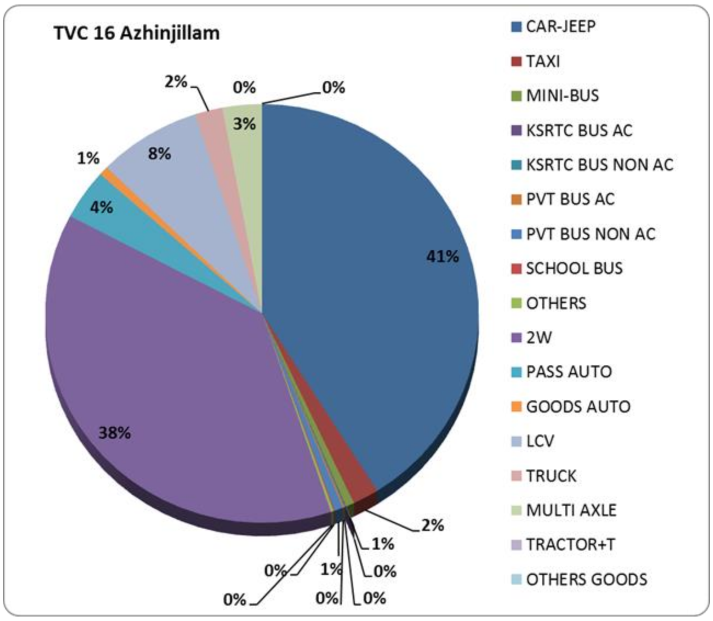
13. Gurupandapuri



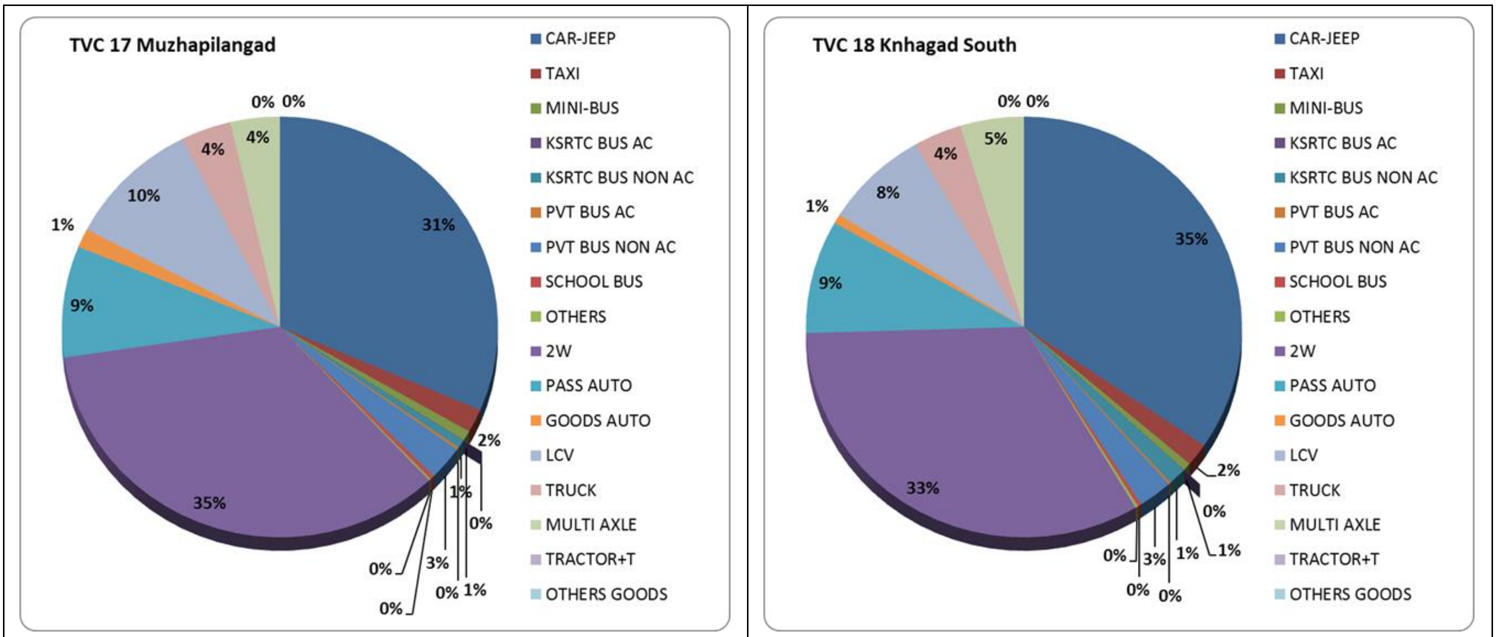
14. Edappal



15. Cheruvannur



16. Azhinjillam



17. Muzhapilangad

18. Knhagad South

Figure2.3: Vehicle Composition

2.3.7. Seasonal Correction Factor (SCF)

Traffic engineers estimate the seasonal impacts by using a factor called as the “Seasonal Correction Factor (SCF)”.The seasonal correction factor is generally derived from fuel sale data, secondary data sources such as historical month-wise traffic data on the project road, monthly toll revenues from existing tolled highways in the immediate influence area. For this project, the estimation of Seasonal Correction Factor was done by using the month wise Fuel Sale data variations of the fuel station along the project corridor. Total 47 fuel stations data collected, but only 32 fuel satiation data were used to derive the SCF. The seasonal correction factor is presented in **Table 2.11.**

Table2.11: Seasonal Correction Factor

Month	Average Sale (2018-2019)		SCF	
	Petrol	Diesel	Petrol	Diesel
April	99	138	0.98	0.98
May	94	131	1.02	1.03
June	96	135	1.00	1.00
July	93	131	1.04	1.03
August	96	132	1.01	1.02
September	97	137	0.99	0.99
October	93	132	1.03	1.02
November	97	136	0.99	0.99
December	96	133	1.00	1.01
January	95	133	1.02	1.02
February	104	147	0.92	0.92
March	96	134	1.00	1.01
Average	**96**	**135**	**1.00**	**1.00**

2.3.8. Annual Average Daily Traffic (AADT)

To convert ADT into AADT, SCF are used In order to obtain an estimate of the variations in the traffic from average. AADT is calculated by multiplying SCF with ADT. AADT in numbers and PCU's obtained for the traffic count locations are presented below in Table 2.12 and Table 2.13.

Table2.12: Location wise - ADT

Vehicle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Car, Jeep, Van	17458	14862	18509	5000	9207	13118	3868	10436	17370	18892	26115	11268	2580	12439	10478	20990	8963	8582
Taxi	827	759	754	334	547	625	443	776	1421	905	2256	1374	343	694	548	997	515	437
Mini Bus	372	288	338	86	157	250	89	300	463	289	593	364	169	399	120	326	223	150
KSRTC Bus AC	64	29	57	1	0	38	1	37	44	36	98	11	1	24	15	27	8	6
KSRTC Bus Non AC	999	870	1016	384	12	867	215	791	680	849	1330	326	173	316	665	42	180	338
Pvt Bus AC	107	57	93	3	42	72	10	78	120	161	215	59	9	62	101	66	56	42
Pvt Bus NON AC	353	168	298	300	60	140	117	53	493	1348	1180	569	131	870	1478	318	743	623
School Bus	124	54	113	53	22	40	46	83	167	111	146	88	89	87	57	51	102	76
Others	4	3	1	5	59	0	3	0	1	42	87	14	0	27	25	101	35	48
2 wheelers	12249	10409	31760	13687	5246	8737	12416	15998	26693	15674	27645	17628	6478	17444	22362	19343	9880	8228
Auto Rickshaw	1993	2550	3656	1216	665	1161	1995	2148	2285	3318	3537	1741	1745	3636	3066	1983	2434	2162
Goods Auto	1424	1072	2023	666	100	1287	657	1050	2889	227	665	304	517	283	688	364	415	176
LCV	1255	718	1242	292	1233	834	249	423	2605	2008	7778	1811	246	1702	2102	3945	2823	1928
Truck	664	387	734	139	418	582	119	211	1683	518	2041	468	300	55	581	1050	1067	890
MAV	483	245	706	118	244	507	64	170	1656	515	3363	467	329	31	223	1499	1041	1174
Tractor Trailer	1	0	2	0	0	1	1	1	2	0	2	1	4	0	0	2	2	1
Others Goods	6	0	0	0	1	3	2	1	5	0	10	0	0	0	0	0	2	0
Passenger Vehicles	***34550***	***30049***	***56595***	***21069***	***16017***	***25048***	***19203***	***30700***	***49737***	***41625***	***63202***	***33442***	***11718***	***35998***	***38915***	***44244***	***23139***	***20692***
Freight Vehicles	***3833***	***2422***	***4707***	***1215***	***1996***	***3214***	***1092***	***1856***	***8840***	***3268***	***13859***	***3051***	***1396***	***2071***	***3594***	***6860***	***5350***	***4169***
Total Vehicles	**38383**	**32471**	**61302**	**22284**	**18013**	**28262**	**20295**	**32556**	**58577**	**44893**	**77061**	**36493**	**13114**	**38069**	**42509**	**51104**	**28489**	**24861**

Table2.13: Location wise – PCU

Vehicle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Car, Jeep, Van	17458	14862	18509	5000	9207	13118	3868	10436	17370	18892	26115	11268	2580	12439	10478	20990	8963	8582
Taxi	827	759	754	334	547	625	443	776	1421	905	2256	1374	343	694	548	997	515	437
Mini Bus	558	432	507	129	236	375	134	450	695	434	890	546	254	599	180	489	335	225
KSRTC Bus AC	192	87	171	3	0	114	3	111	132	108	294	33	3	72	45	81	24	18
KSRTC Bus Non AC	2997	2610	3048	1152	36	2601	645	2373	2040	2547	3990	978	519	948	1995	126	540	1014
Pvt Bus AC	321	171	279	9	126	216	30	234	360	483	645	177	27	186	303	198	168	126
Pvt Bus NON AC	1059	504	894	900	180	420	351	159	1479	4044	3540	1707	393	2610	4434	954	2229	1869
School Bus	186	81	170	80	33	60	69	125	251	167	219	132	134	131	86	77	153	114
Others	12	9	3	15	177	0	9	0	3	126	261	42	0	81	75	303	105	144
2 wheelers	6125	5205	15880	6844	2623	4369	6208	7999	13347	7837	13823	8814	3239	8722	11181	9672	4940	4114
Auto Rickshaw	1993	2550	3656	1216	665	1161	1995	2148	2285	3318	3537	1741	1745	3636	3066	1983	2434	2162
Goods Auto	1424	1072	2023	666	100	1287	657	1050	2889	227	665	304	517	283	688	364	415	176
LCV	1883	1077	1863	438	1850	1251	374	635	3908	3012	11667	2717	369	2553	3153	5918	4235	2892
Truck	1992	1161	2202	417	1254	1746	357	633	5049	1554	6123	1404	900	165	1743	3150	3201	2670
MAV	2174	1103	3177	531	1098	2282	288	765	7452	2318	15134	2102	1481	140	1004	6746	4685	5283
Tractor Trailer	5	0	9	0	0	5	5	5	9	0	9	5	18	0	0	9	9	5
Others Goods	27	0	0	0	5	14	9	5	23	0	45	0	0	0	0	0	9	0
Passenger Vehicles	***31728***	***27270***	***43871***	***15681***	***13830***	***23059***	***13755***	***24811***	***39382***	***38860***	***55569***	***26812***	***9236***	***30117***	***32391***	***35869***	***20406***	***18805***
Freight Vehicles	***7504***	***4413***	***9274***	***2052***	***4306***	***6584***	***1689***	***3092***	***19329***	***7111***	***33643***	***6531***	***3285***	***3141***	***6588***	***16186***	***12553***	***11026***
Total Vehicles	**39231**	**31682**	**53145**	**17733**	**18136**	**29642**	**15444**	**27902**	**58711**	**45971**	**89212**	**33343**	**12521**	**33258**	**38978**	**52055**	**32959**	**29831**

2.4 Origin Destination Survey

The final characteristics have been presented in the following sections:

- Trip Purpose for Passenger Vehicles
- Occupancy for Passenger Vehicles
- Travel Cost per km for Passenger and Commercial Vehicles
- Frequency of Travel for Passenger and Commercial Vehicles
- Willingness to Shift for Passenger and Commercial Vehicles
- Willingness to Pay for Passenger Vehicles
- Factors for shifting to SHSR for Passenger and Commercial Vehicles
- Freight Charge per km (Rs) for Commercial Vehicles
- Commodity Analysis for Commercial Vehicles
- Load Carried (Tonnage) by Commercial Vehicles
- Stated Preference and Willingness to pay results
- Suggestion for Proposed SHSR

2.4.1. Sample Size

The vehicles during the OD surveys were interviewed on a random sample basis. Tables below shows the AADT and the sample size of 24 hours (both in absolute numbers and in percentage terms) captured from the project road. The results are tabulated in **Table 2.14.**

Table2.14: Sample size collected in O-D Survey (both directions vehicles)

Mode	Car	Taxi	Private Bus AC	Private Bus Non AC	KSRTC Bus AC	KSRTC Bus Non AC	Mini Bus	Tempo	LCV	2-3 Axles Trucks	Multi Axle Trucks	Total
OD 01 at TVC 01_NH 66_Thottakadu												
sample	5344	547	41	54	23	272	60	386	572	482	209	6341
AADT	17,460	822	105	352	63	1,007	370	1,416	1,248	660	481	23,984
Percentage	30.6	66.5	39	15.3	36.5	27	16.2	27.3	45.8	73	43.5	26.4
OD 02 at TVC 03_NH 66_Karunagapally												
sample	3561	313	46	211	33	582	132	442	602	377	355	4878
AADT	18,508	750	91	296	57	1,023	337	2,011	1,234	729	702	25,738
Percentage	19.2	41.7	50.5	71.3	57.9	56.9	39.2	22.0	48.8	51.7	50.6	19.0
OD 03 at TVC 06_Ezhinjillam												
sample	3199	435	51	111	33	232	50	160	262	254	296	4111
AADT	13,118	622	72	139	38	873	248	1,280	829	580	505	18,304
Percentage	24.4	69.9	70.8	79.9	86.8	26.6	20.2	12.5	31.6	43.8	58.6	22.5
OD 04 at TVC 09_Kumballam Toll Plaza												
sample	4104	822	74	242	25	235	109	617	1016	707	497	5611
AADT	17,370	1,412	118	492	44	685	460	2,873	2,590	1,674	1,648	29,366
Percentage	23.6	58.2	62.7	49.2	56.8	34.3	23.7	21.5	39.2	42.2	30.2	19.1

Mode	Car	Taxi	Private Bus AC	Private Bus Non AC	KSRTC Bus AC	KSRTC Bus Non AC	Mini Bus	Tempo	LCV	2-3 Axles Trucks	Multi Axle Trucks	Total
OD 05 at TVC 11_Pallikkara Toll Plaza												
sample	5357	745	86	197	36	298	164	521	824	1294	600	6883
AADT	26,114	2,244	215	1,174	99	1,340	589	662	7,734	2,028	3,344	45,543
Percentage	20.5	33.2	40.0	16.8	36.4	22.2	27.8	78.7	10.7	63.8	17.9	15.1
OD 06 at TVC 13_NH 66_Gurupadapuri												
sample	640	106	4	60	2	57	43	177	145	143	135	912
AADT	2,579	342	9	130	2	174	168	514	245	298	327	4,788
Percentage	24.8	31.0	44.4	46.2	100.0	32.8	25.6	34.4	59.2	48.0	41.3	19.0
OD 07 at TVC 16_NH-66												
sample	6111	614	38	187	22	26	153	195	1050	493	518	7151
AADT	20,990	991	66	316	27	42	324	363	3,923	1,044	1,490	29,576
Percentage	29.1	62.0	57.6	59.2	81.5	61.9	47.2	53.7	26.8	47.2	34.8	24.2
OD 08 at TVC 17_Muzhapilangad Toll												
sample	2375	184	47	435	4	131	168	335	875	637	427	3344
AADT	8,963	512	56	740	8	181	223	412	2,808	1,061	1,035	15,999
Percentage	26.5	35.9	83.9	58.8	50.0	72.4	75.3	81.3	31.2	60.0	41.3	20.9
OD 09 at TVC 18_Knhagarh South												
sample	4080	228	22	401	4	221	98	156	1358	504	561	5054
AADT	8,581	434	43	620	6	341	149	174	1,916	886	1,168	14,318
Percentage	47.5	52.5	51.2	64.7	66.7	64.8	65.8	89.7	70.9	56.9	48.0	35.3

Based on the sample size of different categories of vehicles interviewed during the OD survey, direction-wise expansion factors were calculated for the expansion of OD matrices generated from the sample data to assess the travel pattern of the vehicles plying on the project road.

2.4.2. Traffic Zoning System

To understand the spatial dimensions of the trip characteristics of the vehicles interviewed during the O-D survey, a detailed zoning system was developed giving due consideration to the following factors:

- The road network catering to the traffic on the project road and its generating points
- Important towns, villages, factories and industrial centres around the project road area.
- Administrative boundaries of districts and states.
- Configuration of the project road in the regional road network with respect to other roads

Two major types of areas were identified for analysis purpose:-

Immediate Influence Area (IIA): Immediate Influence Area includes the cities/towns/villages and districts along the project road and adjacent to it which generates/attracts trips to the project road. In this study it consists of districts within Kerala.

Broad Influence Area (BIA): Broad Influence Area includes the rest of Pondicherry, Tamil Nadu, Karnataka and the rest of India.

Detailed zoning system is prepared for IIA, while more aggregate or broad zoning is developed for BIA. The zoning system adopted for data collection is based on 196 zones and is presented.

The list of traffic zones is presented below in **Table 2.15** below.

Table2.15: List of Zones

Zone Code	Zone Name	District	State/UT
1	Manjeshwar	Kasaragod	Kerala
2	Kasaragod (Town)	Kasaragod	
3	Uduma	Kasaragod	
4	Kanhangad	Kasaragod	
5	Trikaripur	Kasaragod	
6	Payyanur	Kasaragod	
7	Kasargod (Rest of Dist.)	Kasaragod	
8	Taliparamba	Kannur	
9	Kalliasseri	Kannur	
10	Azhikode	Kannur	
11	Kannur (City)	Kannur	
12	Thottada	Kannur	
13	Edakkad	Kannur	
14	Dharmadam	Kannur	
15	Thalassery	Kannur	
16	Kadirur	Kannur	
17	Kuthuparamba	Kannur	
18	Kannur International Airport/Mattannur	Kannur	
19	Iritty	Kannur	
20	Peravoor	Kannur	
21	Kannur (Rest of Dist.)	Kannur	
22	Mahe	Mahe	Puducherry
23	Nadapuram	Kozhikode	Kerala
24	Vadakara	Kozhikode	
25	Perambra	Kozhikode	
26	Quilandy	Kozhikode	
27	Elathur	Kozhikode	
28	Kozhikode(City)	Kozhikode	
29	Beypore	Kozhikode	
30	Thenhipalam	Kozhikode	
31	Thamarassery	Kozhikode	
32	Thiruvambadi	Kozhikode	
33	Kozhikode (Rest of Dist.)	Kozhikode	
34	Kalpetta	Wayanad	
35	Sulthan Bathery	Wayanad	
36	Mananthavady	Wayanad	
37	Wayanad (Rest of Dist.)	Wayanad	

Zone Code	Zone Name	District	State/UT
38	Parappanangadi	Malappuram	
39	Tirurangadi	Malappuram	
40	Vengara	Malappuram	
41	Tanur	Malappuram	
42	Kottakkal	Malapuram	
43	Tirur	Malapuram	
44	Thavanur	Malapuram	
45	Kuttipuram	Malapuram	
46	Edappal	Malapuram	
47	Ponnani	Malapuram	
48	Calicut International Airport/Karipur/ Kondotty	Malapuram	
49	Areekode	Malapuram	
50	Edavanna	Malapuram	
51	Nilambur	Malapuram	
52	Manjeri	Malapuram	
53	Ernad	Malapuram	
54	Malappuram (City)	Malappuram	
55	Mankada	Malappuram	
56	Perinthalmanna	Malappuram	
57	Malappuram (Rest of Dist.)	Malappuram	
58	Thrithala	Palakkad	
59	Pattambi	Palakkad	
60	Shornur	Palakkad	
61	Ottapalam	Palakkad	
62	Vadakkancherry	Palakkad	
63	Palakkad (Rest of Dist.)	Palakkad	
64	Kunnamkulam	Thrissur	
65	Chelakkara	Thrissur	
66	Guruvayoor	Thrissur	
67	Thrissur (City.)	Thrissur	
68	Ollur	Thrissur	
69	Nattika/ Triparayar	Thrissur	
70	Puthukkad	Thrissur	
71	Kaipamangalam	Thrissur	
72	Irinjalakuda	Thrissur	
73	Chalakudy	Thrissur	
74	Kodungallur	Thrissur	
75	Thrissur (Rest of Dist.)	Thrissur	
76	Cochin International Airport/Angamaly	Ernakulam	
77	North Paravoor	Ernakulam	
78	Aluva	Ernakulam	
79	Kunnathunad	Ernakulam	
80	Kochi	Ernakulam	
81	Thrippunithura	Ernakulam	
82	Perumbavoor	Ernakulam	
83	Kothamangalam	Ernakulam	

Zone Code	Zone Name	District	State/UT
84	Muvattupuzha	Ernakulam	
85	Piravom	Ernakulam	
86	Koothattukulam	Ernakulam	
87	Ernakulam (Rest of Dist.)	Ernakulam	
88	Thodupuzha	Idukki	
89	Idukki (Rest of Dist.)	Idukki	
90	Aroor	Alappuzha	
91	Cherthala	Alappuzha	
92	Mararikulam	Alappuzha	
93	Alappuzha (City)	Alappuzha	
94	Ambalapuzha	Alappuzha	
95	Kuttanad	Alappuzha	
96	Haripad	Alappuzha	
97	Chengannur	Alappuzha	
98	Mavelikkara	Alappuzha	
99	Kayamkulam	Alappuzha	
100	Alappuzha (Rest of Dist.)	Alappuzha	
101	Thalayolaparambu	Kottayam	
102	Vaikom	Kottayam	
103	Kaduthuruthy	Kottayam	
104	Pala	Kottayam	
105	Ettumanoor	Kottayam	
106	Kottayam (City)	Kottayam	
107	Puthuppally	Kottayam	
108	Pampady	Kottayam	
109	Kanjirappally	Kottayam	
110	Changanassery	Kottayam	
111	Kottayam (Rest of Dist.)	Kottayam	
112	Thiruvalla	Pathanamthitta	
113	Mallappally	Pathanamthitta	
114	Aranmula	Pathanamthitta	
115	Pandalam	Pathanamthitta	
116	Adoor	Pathanamthitta	
117	Ranni	Pathanamthitta	
118	Pathanamthitta (City)	Pathanamthitta	
119	Konni	Pathanamthitta	
120	Chittar	Pathanamthitta	
121	Sabarimala	Pathanamthitta	
122	Gavi	Pathanamthitta	
123	Pathanamthitta (Rest of Dist.)	Pathanamthitta	
124	Karunagappally	Kollam	
125	Chavara	Kollam	
126	Sasthamkotta	Kollam	
127	Kollam (City.)	Kollam	
128	Kundara	Kollam	
129	Kottarakkara	Kollam	
130	Chathannoor	Kollam	

Zone Code	Zone Name	District	State/UT
131	Pathanapuram	Kollam	
132	Punalur	Kollam	
133	Chadayamangalam	Kollam	
134	Parippally	Kollam	
135	Kollam (Rest of Dist.)	Kollam	
136	Varkala	Thiruvananthapuram	
137	Attingal	Thiruvananthapuram	
138	Kilimanoor	Thiruvananthapuram	
139	Vamanapuram	Thiruvananthapuram	
140	Chirayinkeezhu	Thiruvananthapuram	
141	Venjaramoodu	Thiruvananthapuram	
142	Nedumangad	Thiruvananthapuram	
143	Thiruvananthapuram (City)	Thiruvananthapuram	
144	Trivandrum International Airport	Thiruvananthapuram	
145	Aruvikkara	Thiruvananthapuram	
146	Kattakkada	Thiruvananthapuram	
147	Kovalam	Thiruvananthapuram	
148	Neyyattinkara	Thiruvananthapuram	
149	Thiruvananthapuram (Rest of Dist.)	Thiruvananthapuram	
150	Dharmapuri	North TN	Tamilnadu
151	Tiruvannamalai	North TN	
152	Vellore	North TN	
153	Kanchipuram	North TN	
154	Chennai	North TN	
155	Ooty	North TN	
156	Coimbatore	North TN	
157	Erode	North TN	
158	Salem	North TN	
159	Pollachi	North TN	
160	Rest of North TN	Tiruvallur,Krishnagiri,Villupuram, Cuddalore, Nilgiris, Tiruppur	
161	Karaikal	Karaikal	Puducherry
162	Karur	North central TN	Tamilnadu
163	Pudukkotai	North central TN	
164	Thiruchirapalli	North central TN	
165	Thanjavur	North central TN	
166	Kumbakonam	North central TN	
167	Rest of North central TN	Namakkal, Peramballur, Ariyalur, Nagapattinam, Thiruvarur	
168	Theni	South central TN	
169	Madurai	South central TN	
170	Karaikkudi	South central TN	
171	Madurai	South central TN	
172	Dindigul	South central TN	
173	Palani	South central TN	
174	Sivakasi	South central TN	
175	Rameshwaram	South central TN	

Zone Code	Zone Name	District	State/UT
176	Rest of South central TN	Sivaganga, Ramanathapuram, Virudhunagar	
177	Nagercoil	South TN	
178	Thirunelveli	South TN	
179	Thoothukudi	South TN	
180	Rest of South TN	Kanyakumari, Tirunelveli, Thoothukudi	
181	Mangalore	Dakshina Kannada	Karnataka
182	Rest of Coastal Karnataka	Dakshina Kannada, Udupi, Uttar Kannada	
183	Mysore	South Karnataka	
184	Madikeri	South Karnataka	
185	Bengaluru	South Karnataka	
186	Hassan	South Karnataka	
187	Tumakuru	South Karnataka	
188	Chikmagalur	South Karnataka	
189	Shivamogga	South Karnataka	
190	Davanagere	South Karnataka	
191	Rest of South Karnataka	Chamarajanagar, Chikkaballapur, Chitradurga, Kodagu, Kolar, Mandya,Ramanagara.	
192	Bellari	North Karnataka	
193	Hubli	North Karnataka	
194	Belgaum	North Karnataka	
195	Rest of North Karnataka	Vijayapura, Bagalkot, Bidar, Gulbarga, Yadagiri, Raichur, Gadag, Dharwad, Haveri and Koppal districts.	
196	Rest of India		
200	Out Side India		

2.4.3. Development of Origin-Destination Matrices

The Location wise O-D matrices from the survey data were developed at all the locations along the project corridor as given in the Annexures are attached with this report in excel format. The details of the annexures are as follows:

Annexures 2.0 : OD Matrixes - Nine Locations
Annexures 2.1 : Kannur Airport Analysis
Annexures 2.1 : Kochi Airport Terminal 1 & 3 Analysis
Annexures 2.1 : Kozhikode Airport Analysis
Annexures 2.1 : Thiruvananthapuram Airport Analysis
Annexures 2.1 : Combined Airport Analysis
Annexures 2.2 : Ernakulam bus stand Analysis
Annexures 2.2 : Kozhikode bus stand Analysis
Annexures 2.2 : Trissur bus stand Analysis
Annexures 2.2 : Thiruvananthapuram bus stand Analysis
Annexures 2.2 : Combined Bus Stand Analysis

Annexures 2.3 : Ernakulam Railway station analysis
Annexures 2.3 : Kollam Railway station Analysis
Annexures 2.3 : Kozhikode Railway station Analysis
Annexures 2.3 : Thiruvananthapuram Railway station Analysis
Annexures 2.3 : Combined Railway Station Analysis
Annexures 2.4 : Operator Survey Freight forward agency
Annexures 2.4 : Operator Survey Truck Operator
Annexures 2.5 : On Board Survey Airport
Annexures 2.5 : On Board Survey Train
Annexures 2.5 : On Board Survey Bus
Annexures 2.5 : On Board Survey Combined

2.4.4. Regional Distribution on the Project Road

Based on the zoning system devised for this study, the sample data has been expanded using factors based on the total AADT. The expanded O-D matrices for all the vehicle categories on the project road section are presented in Annexures 2.0 (attached with this report in excel format).

Based on the above OD matrix, the regional distribution at all OD has been calculated. The distribution indicates the attraction and generation zones for the traffic on the project road.

Table2.16: Suggestion for Proposed SHSR (%age)

Region/ Modes	Car	Taxi	Private Bus AC	Private Bus Non AC	KSRTC Bus AC	KSRTC Bus Non AC	Mini Bus	Tempo	LCV	2-3 Axles Trucks	Multi Axle Trucks
OD 01 at TVC 01_NH 66_Thottakadu											
Kerala	98.3	97.5	100.0	94.1	100.0	98.6	98.5	97.8	96.4	95.6	93.6
Pondicherry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0
Tamil Nadu	1.5	2.3	0.0	2.0	0.0	0.6	1.5	1.1	2.4	3.0	4.2
Karnataka	0.2	0.2	0.0	3.8	0.0	0.8	0.0	0.3	0.2	0.2	0.4
Rest of India	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.7	1.0	1.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
OD 02 at TVC 03_NH 66_Karunagapally											
Kerala	98.0	96.1	100.0	96.5	89.4	97.0	97.1	99.4	97.5	96.1	89.2
Pondicherry	0.2	0.0	0.0	0.0	0.0	0.3	0.0	0.4	0.1	0.5	0.1
Tamil Nadu	1.4	3.6	0.0	2.8	7.5	2.1	2.1	0.0	1.7	1.8	3.3
Karnataka	0.3	0.2	0.0	0.5	3.1	0.0	0.8	0.2	0.3	1.3	3.0
Rest of India	0.2	0.0	0.0	0.3	0.0	0.6	0.0	0.0	0.4	0.3	4.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
OD 03 at TVC 06_Ezhinjillam											
Kerala	97.8	96.5	94.1	98.3	95.8	97.8	98.1	96.4	96.6	94.3	95.3
Pondicherry	0.2	0.1	0.8	0.0	0.0	0.1	0.0	0.4	0.0	0.4	0.0
Tamil Nadu	1.4	2.2	5.1	1.4	2.8	2.0	1.9	2.1	2.6	3.2	2.3
Karnataka	0.4	0.7	0.0	0.3	0.0	0.0	0.0	0.8	0.6	1.2	1.6
Rest of India	0.3	0.6	0.0	0.0	1.4	0.0	0.0	0.4	0.2	0.9	0.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Region/ Modes	Car	Taxi	Private Bus AC	Private Bus Non AC	KSRTC Bus AC	KSRTC Bus Non AC	Mini Bus	Tempo	LCV	2-3 Axles Trucks	Multi Axle Trucks
OD 04 at TVC 09_Kumballam Toll Plaza											
Kerala	99.1	98.4	100.0	99.4	98.1	99.8	99.3	99.2	98.4	96.8	95.5
Pondicherry	0.1	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Tamil Nadu	0.5	1.0	0.0	0.0	0.0	0.2	0.0	0.2	0.8	1.5	1.2
Karnataka	0.1	0.3	0.0	0.2	1.9	0.0	0.7	0.5	0.6	1.0	1.4
Rest of India	0.2	0.2	0.0	0.2	0.0	0.0	0.0	0.1	0.2	0.6	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
OD 05 at TVC 11_Pallikkara Toll Plaza											
Kerala	95.9	94.8	91.2	91.0	97.1	95.7	93.1	95.3	89.1	82.7	69.2
Pondicherry	0.1	0.2	1.2	0.4	0.0	0.1	0.0	0.1	0.0	0.0	0.1
Tamil Nadu	3.8	4.3	6.4	3.3	2.9	4.2	6.1	3.9	8.9	12.1	14.9
Karnataka	0.1	0.2	1.2	4.5	0.0	0.0	0.0	0.6	0.8	2.8	4.9
Rest of India	0.1	0.5	0.0	0.8	0.0	0.0	0.8	0.2	1.2	2.3	10.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
OD 06 at TVC 13_NH 66_Gurupadapuri											
Kerala	99.3	99.3	100.0	100.0	100.0	100.0	100.0	98.6	96.6	88.5	85.1
Pondicherry	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tamil Nadu	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.7	2.0	6.0	5.5
Karnataka	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	2.1	3.0
Rest of India	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.3	3.4	6.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
OD 07 at TVC 16_NH-66											
Kerala	97.4	97.0	96.0	95.1	95.5	100.0	97.0	97.7	91.3	87.0	74.9
Pondicherry	2.0	2.3	2.7	4.0	4.5	0.0	1.7	2.0	2.7	0.9	1.6
Tamil Nadu	0.3	0.2	0.0	0.3	0.0	0.0	0.8	0.0	2.2	4.8	5.6
Karnataka	0.2	0.4	1.3	0.3	0.0	0.0	0.3	0.4	2.0	2.9	6.5
Rest of India	0.1	0.1	0.0	0.3	0.0	0.0	0.3	0.0	1.8	4.4	11.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
OD 08 at TVC 17_Muzhapilangad Toll											
Kerala	93.3	97.9	100.0	99.1	100.0	98.8	99.4	90.2	88.3	78.2	65.0
Pondicherry	1.7	0.5	0.0	0.1	0.0	0.8	0.0	5.4	3.5	2.8	1.1
Tamil Nadu	1.1	0.5	0.0	0.2	0.0	0.4	0.0	2.8	2.6	6.4	5.3
Karnataka	2.3	0.5	0.0	0.5	0.0	0.0	0.6	1.1	3.2	6.1	6.5
Rest of India	1.6	0.5	0.0	0.1	0.0	0.0	0.0	0.5	2.4	6.5	22.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
OD 09 at TVC 18_Knhagarh South											
Kerala	95.2	92.8	100.0	98.2	75.0	98.4	90.2	96.8	88.8	71.8	61.1
Pondicherry	0.6	0.6	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.8	0.3
Tamil Nadu	0.4	0.6	0.0	0.6	0.0	1.3	0.0	0.3	0.9	2.0	5.0
Karnataka	2.7	5.2	0.0	1.0	25.0	0.3	7.6	1.6	8.3	18.1	25.7
Rest of India	1.0	0.8	0.0	0.1	0.0	0.0	2.2	1.2	1.9	7.4	8.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Car/Taxi Traffic Share

- About 97 percent of total Car/Taxi traffic is from Kerala. Tamil Nadu contributing about 1.20 per cent, 0.70 per cent from Karnataka, 0.60 percent from Pondicherry and remaining 0.40 per cent of share is from rest of India.
- All buses, Kerala share is about 97 per cent, Karnataka/Tamil Nadu shares 2.5 per cent and rest India contribute each with 0.5 per cent.
- Location wise Car/Taxi and Buses traffic share is as below,

Table2.17: Willingness to Shift to SHSR Results

S. No.	Location	Car/Taxi Share (%)	Buses Share (%)	Districts
1	OD 01 at TVC 01_NH 66_Thottakadu	85	79	Kollam & Thiruvananthapuram
2	OD 02 at TVC 03_NH 66_Karunagapally	69	67	Kollam, Ernakulam and Alappuzha
3	OD 03 at TVC 06_Ezhinjillam	53	66	Kottayam, Pathanamthitta and Kollam
4	OD 04 at TVC 09_Kumballam Toll Plaza	60	60	Ernakulam and Alappuzha
5	OD 05 at TVC 11_Pallikkara Toll Plaza	67	61	Ernakulam and Thrissur
6	OD 06 at TVC 13_NH 66_Gurupadapuri	63	82	Mallapuram and Thrissur
7	OD 07 at TVC 16_NH-66	74	68	Kozhikode and Mallapuram
8	OD 08 at TVC 17_Muzhapilangad Toll	68	92	Kannur
9	OD 09 at TVC 18_Knhagarh South	78	95	Kasaragod

Freight Traffic

- In case of heavy freight vehicles (2A/3A/MAV), Kerala contributes about 84 per cent, Kerala and Tamil Nadu contributes 5 per cent each followed by Rest of India about 6.0 per cent.
- LCV traffic (including Tempo), Kerala contributes around 95 per cent followed by Tamil Nadu 2.0 per cent and Karnataka 1.2 percent.

2.4.5. Trip Purpose

An analysis was also carried out to assess the purpose of car and taxi trips. **Table 2.18** summarises the purpose-wise trip characteristics of the passenger Cars/Taxi at all locations.

Table2.18: Purpose - wise Car/Taxi Trips (%)

Mode of Vehicle	Car	Taxi
Work (W)	42%	36%
Business (B)	22%	22%
Education (E)	3%	3%
Social (S)	8%	10%
Tourist (T)	8%	12%
Other (O)	18%	17%
Total	**100%**	**100%**

- The work and business trips are more than 60 per cent.
- The social and tourist trips are (9-10 per cent) observed all locations.

2.4.6. Occupancy

An analysis was also carried out to assess the occupancy of passenger trips. **Table 2.19** summarises the purpose-wise trip characteristics of the passenger Cars/Taxi at all locations.

Table2.19: Occupancy Analysis

Mode of vehicle	Car	Taxi	Private Bus AC	Private Bus Non AC	KSRTC Bus AC	KSRTC Bus Non AC	Mini Bus
Average Occupancy	3	3	34	31	30	34	25
Maximum Occupancy	9	9	55	54	47	55	30

- Car/Taxi trips found to be having average occupancy as 3 and maximum as 9 persons.
- Busses found to be having average occupancy as 30 and maximum as 55 persons.
- Mini Busses found to be having average occupancy as 25 and maximum as 30 persons.

2.4.7. Travel Cost per km for Passenger Vehicles

An analysis was also carried out to assess the average cost per km of passenger trips. **Table 2.20** summarises the average cost per km characteristics of the passenger vehicles at all locations.

- Cars found are to be having travel cost about Rs.9 per km while taxies has travel cost of Rs.12 per km.
- Busses are found to be having travel cost ranging from Rs.4 to Rs.5 per km.

Table2.20: Travel Cost Analysis

Mode of vehicle / Travel Cost	Car	Taxi	Private Bus AC	Private Bus Non AC	KSRTC Bus AC	KSRTC Bus Non AC	Mini Bus
Total Travel Distance (km)	366286	49439	3412	16856	2861	31844	10861
Total Travel Cost (Rs)	3189062	521666	10398	53908	9416	78018	41005
Travel Cost per km	9	12	4	4	5	4	5

2.4.8. Travel Frequency Analysis

An analysis was also carried out to assess the travel frequency of all vehicle modes. **Table 2.21** summarises the travel frequency at all locations.

Table2.21: Travel Frequency Analysis (%)

Mode	Daily	Monthly	Weekly	Occasionally
Car/Taxi	36%	17%	27%	20%
Buses	72%	8%	12%	8%
LCVs	82%	10%	7%	0%
Trucks	59%	33%	8%	0%

- Car/Taxi trips found to be having travel frequency of about 36 per cent daily, 27 percent weekly, 17 per cent weekly and 20 per cent occasionally.
- Bus trips found to be having travel frequency of about 72 per cent daily, 8 percent weekly, 12 per cent weekly and 8 per cent occasionally.
- LCVs trips found to be having travel frequency of about 82 per cent daily, 7 percent weekly and 10 per cent monthly.
- LCVs trips found to be having travel frequency of about 59 per cent daily, 8 percent weekly and 33 per cent monthly.

2.4.9. Willingness to Shift Analysis

An analysis was also carried out to have an opinion about willingness to shift to proposed semi high speed rail corridor. The result is presented below in **Table 2.22**.

Table2.22: Willingness to Shift Analysis (%)

Mode	Yes	No	Total
Car/Taxi	95%	5%	100%
Buses	96%	4%	100%
LCVs	100%	0%	100%
Trucks	100%	0%	100%

- About 95 per cent to 96 percent of total car/taxi modes are shown their willingness to shift to proposed semi high speed corridor.
- 100 per cent of LCVs and Trucks are quoted that they would shift to proposed semi high speed corridor.

2.4.10. Willingness to Pay Analysis

An analysis was also carried out to have an opinion about willingness to pay. The result is presented below in **Table 2.23**.

Table2.23: Willingness to Shift Analysis (%)

WTP	Same	1.25 Times	1.5 times	2 times	3 times	4 times	5 times	Total
Car/Taxi	52%	38%	8%	1%	0%	0%	0%	100%
Buses	52%	39%	6%	1%	1%	0%	0%	100%

About 52 per cent said that they will pay same as their present expenditure while 38-39 per cent said that they will pay 1.25 times of what they are paying at present.

2.4.11. Expectation from SHSR

An analysis was also carried out to have an opinion about the expectation from SHSR.. The result is presented below in **Table 2.24**.

Table2.24: Willingness to Shift (%)

Expectation from SHSR	Comfort	Less Time	Less Cost	Reliability	Air Condition	Less Crowd	Better than Present system	Total
Car/Taxi	44%	29%	12%	6%	2%	3%	4%	100%
Buses	42%	27%	12%	7%	3%	3%	5%	100%

About 42-44 per cent is expected to improve comfort while 27-29 per cent said that they will expect that proposed SHSR would reduce their travel as compared to present transportation system.

2.4.12. Commodity Distribution on Project Road

An analysis was also carried out to understand the different commodities being transported by the commercial vehicles. **Table 2.25** presents the commodity - wise share of the total commercial traffic.

Table2.25: Commodity Distribution (%)

S. no.	Commodity Type	Tempo	LCV	2-3 Axles Trucks	Multi Axle Trucks
1	Building Materials	21%	19%	17%	18%
2	Agricultural Products/Milk/Fish	15%	15%	12%	12%
3	Chemicals/Fertilizers	4%	4%	5%	3%
4	Petroleum Products	5%	9%	13%	14%
5	Textile	2%	3%	3%	3%
6	Manufactured/Electronic Goods	3%	4%	5%	6%
7	House Hold Goods	7%	8%	9%	7%
8	Construction Materials	3%	5%	4%	6%
9	Machinery	2%	3%	4%	4%
10	Iron & Steel	2%	3%	3%	6%
11	Minerals & Ores	3%	2%	2%	2%
12	Automobiles	4%	3%	3%	5%
13	Empty	23%	18%	12%	7%
14	Others	5%	6%	6%	6%
Total	Total	100%	100%	100%	100%

From the commodity analysis it is found that most of the commercial vehicles are found to be carrying building materials and agricultural products.

2.4.13. Tonnage Analysis

An analysis was also carried out to understand the load carried by the commercial vehicles. **Table 2.26** presents the amount of load carried by the total commercial traffic

Table2.26: Tonnage Analysis (%)

S. No.	Vehical Mode	Tonnage/ Vehical
1	Tempo	3
2	LCV	6
3	2-3 Axles Trucks	10
4	Multi Axle Trucks	16

2.5 Airport Survey

2.5.1. Suggestion for Proposed SHSR

The information has been collected from the users in such a way that, what they are expecting from the new facility along with other information at all the survey locations. The results are tabulated in **Table 2.27.** 50% of all passengers are expecting the proposed facility overall better than the present system. 14% of all the passengers are expecting the new facility at a less cost than the present system of transportation.

Table2.27: Suggestion for Proposed SHSR (%)

Journey type	Total No of Pass	Comfort	Less Time	Less cost	Reliability	Air condition	Less crowd	Better than Present system
Kochi Airport Terminal 1 & 3								
Arrival	1036	22%	19%	0%	0%	0%	52%	8%
Departure	1129	23%	13%	5%	0%	0%	37%	23%
Combined	2165	22%	16%	2%	0%	0%	44%	16%
Trivandrum Airport								
Arrival	711	12%	20%	13%	0%	0%	0%	55%
Departure	803	12%	16%	17%	2%	0%	0%	51%
Combined	1514	12%	18%	15%	2%	0%	0%	53%
Kozikode Airport								
Arrival	406	17%	14%	17%	0%	0%	0%	51%
Departure	450	14%	14%	11%	4%	0%	0%	58%
Combined	856	16%	14%	14%	2%	0%	0%	55%
Kannur Airport								
Arrival	374	22%	18%	11%	0%	0%	0%	48%
Departure	433	13%	16%	9%	6%	0%	0%	55%
Combined	807	17%	17%	10%	3%	0%	0%	52%
Combined Airport								
Alighting	2527	13%	19%	16%	0%	0%	0%	52%
Boarding	2815	17%	19%	13%	4%	0%	0%	47%
Combined	5342	15%	19%	14%	2%	0%	0%	50%

2.5.2. Willingness to pay survey

The opinion of the users in terms of willingness to pay extra amount for the new facility if they opt, has been taken along with the other information at all the survey locations. The results are tabulated in **Table 2.28.** It is concluded from the analysis that 54% of air passengers are ready to opt for the facility at the same cost and only 8% of all the passengers are ready to opt for the facility at the rate of 1.25 times for their present cost of travel. If the new facility cost is three times to their present journey cost, nobody is ready to accept the new facility.

Table2.28: Stated Preference and Willingness to pay results (%)

Journey type	Total No of Pass	Same	1.25 times	1.5 times	2 times	3 times	4 times	5 times	>5 times
Trivandrum Airport									
Arrival	711	30%	48%	22%	0%	0%	0%	0%	0%
Departure	803	34%	48%	17%	0%	0%	0%	0%	0%
Combined	1514	32%	48%	19%	0%	0%	0%	0%	0%
Kozikode Airport									
Arrival	406	51%	48%	0%	0%	0%	0%	0%	0%
Departure	450	56%	42%	2%	0%	0%	0%	0%	0%
Combined	856	54%	45%	1%	0%	0%	0%	0%	0%
Kochi Airport Terminal 1 & 3									
Arrival	1036	82%	18%	0%	0%	0%	0%	0%	0%
Departure	1129	38%	50%	12%	0%	0%	0%	0%	0%
Combined	2165	61%	33%	6%	0%	0%	0%	0%	0%
Kannur Airport									
Arrival	374	58%	42%	0%	0%	0%	0%	0%	0%
Departure	433	97%	3%	0%	0%	0%	0%	0%	0%
Combined	807	79%	21%	0%	0%	0%	0%	0%	0%
Combined Airport									
Alighting	2527	59%	35%	6%	0%	0%	0%	0%	0%
Boarding	2815	49%	41%	10%	0%	0%	0%	0%	0%
Combined	5342	54%	37%	8%	0%	0%	0%	0%	0%

2.5.3. Trip Purpose

An analysis was also carried out to assess the purpose of passenger’s trips. **Table 2.29** summarises the purpose-wise trip characteristics of the passengers at all locations.

Table2.29: Purpose wise Trips (%)

Purpose	Work	Business	Education	Social	Recreation	Religious	Others
Arrival	39%	38%	7%	5%	5%	1%	4%
Departure	41%	36%	15%	3%	2%	1%	3%
Combined	40%	37%	11%	4%	4%	1%	4%

- The work and business trips are more than 70 per cent.
- The social and tourist trips are (8 per cent) observed all locations.

2.5.4. Travel Frequency Analysis

An analysis was also carried out to assess the travel frequency of all vehicle modes. **Table 2.30** summarises the travel frequency at all locations.

- Occasionally Trip found to be having travel frequency of about 66 per cent and 3 per cent monthly.

Table2.30: Travel Frequency Analysis (%)

Frequency	Daily	Monthly	Weekly	Occasionally
Arrival	0%	2%	19%	79%
Departure	0%	3%	43%	54%
Combined	0%	3%	32%	66%

2.5.5. Travel Mode

An analysis was also carried out to assess the travel mode trips. Cars and Taxi share found more than 90% share w.r.t. other modes.

Table2.31: Travel Mode Analysis (%)

Travel Mode	Car	Taxi	2 Wh	Auto	Sh. Auto	Bus	AC Bus-Govt.	AC Bus-Pvt.	Rail	Cycle	Walk	Other
Arrival	51%	42%	1%	1%	0%	3%	1%	1%	1%	0%	0%	0%
Departure	58%	34%	3%	1%	0%	3%	0%	0%	1%	0%	0%	0%
Combined	54%	38%	2%	1%	0%	3%	1%	0%	1%	0%	0%	0%

2.5.6. Trip Length

An analysis was also carried out to assess the trip length of passenger trips. The details of trip length distribution are presented in the table below.

Table2.32: Trip Length (Km) Distribution (%)

Trip Length	0 – 20	21 - 50	51 - 100	101 - 250	251 - 500	501 - 1000	> 1000
Arrival	12%	38%	28%	22%	0%	0%	0%
Departure	23%	36%	23%	19%	0%	0%	0%
Combined	17%	37%	25%	20%	0%	0%	0%

2.5.7. Travel Cost

An analysis was also carried out to assess the travel cost of passenger trips. The details of travel cost distribution are presented in the table below.

- The 46% of the trips are paying more than Rs. 1000/- to reach the travel mode facility.

Table2.33: Travel Cost Analysis (%)

Travel Cost	>= 50	50 to 100	100 to 200	200 to 500	500 to 1000	1000 to 5000	< 5000
Arrival	1%	2%	5%	22%	20%	49%	1%
Departure	3%	4%	15%	21%	16%	41%	0%
Combined	2%	3%	10%	22%	18%	45%	1%

2.5.8. Trips based on Kerala residency and willing to Shift

There are 94% of the total trips belong to the Kerala State and 96% trips wants to shift for the new facility.

Table2.34: Trips based on Kerala residency and willing to Shift (%)

Mode	Kerala residency		willing to Shift	
	Yes	No	Yes	No
Arrival	90%	10%	96%	4%
Departure	98%	2%	95%	5%
Combined	94%	6%	96%	4%

2.5.9. Trip Based on the Occupation

The result is presented below in **Table 2.35**.

Table2.35: Occupation (%)

Journey type	Govt Service	Private Service	Business	Student	Housewife	Retired	Unemployed
Arrival	15%	36%	36%	5%	5%	2%	1%
Departure	9%	37%	35%	13%	4%	1%	1%
Combined	11%	37%	36%	9%	4%	2%	1%

About 84 per cent trips are belonging to the Service and Business class occupation.

2.6 Bus Stand Survey

2.6.1. Suggestion for Proposed SHSR

The information has been collected from the users in such a way that, what they are expecting from the new facility along with other information at all the survey locations. The results are tabulated in **Table 2.36.** 28% of all passengers are expecting the proposed facility overall better than the present system. 26% of all the passengers are expecting the new facility at a less cost than the present system of transportation.

Table2.36: Suggestion for Proposed SHSR (%)

Journey type	Total No of Pass	Comfort	Less Time	Less cost	Reliability	Air condition	Less crowd	Better than Present system
Trivandrum Bus stand								
Alighting	1302	20%	3%	29%	12%	0%	0%	35%
Boarding	2273	14%	4%	37%	9%	0%	0%	36%
Combined	3575	16%	4%	34%	10%	0%	0%	36%
Trissur Bus stand								
Alighting	930	38%	1%	28%	10%	0%	0%	22%
Boarding	1032	8%	15%	32%	17%	0%	0%	27%
Combined	1962	22%	9%	30%	14%	0%	0%	25%
Ernakulum Bus stand								
Alighting	615	36%	2%	29%	10%	0%	0%	23%
Boarding	1123	17%	13%	30%	15%	0%	0%	25%
Combined	1738	24%	9%	30%	13%	0%	0%	24%

Journey type	Total No of Pass	Comfort	Less Time	Less cost	Reliability	Air condition	Less crowd	Better than Present system
Kozikode Bus stand								
Alighting	1301	5%	37%	12%	23%	1%	0%	23%
Boarding	1101	18%	27%	4%	31%	0%	0%	19%
Combined	2402	11%	32%	8%	27%	1%	0%	21%
Combined Bus stand								
Alighting	4148	22%	13%	23%	15%	0%	0%	27%
Boarding	5529	14%	13%	28%	16%	0%	0%	29%
Combined	9677	17%	13%	26%	15%	0%	0%	28%

2.6.2. Willingness to pay survey

The opinion of the users in terms of willingness to pay extra amount for the new facility if they opt, has been taken along with the other information at all the survey locations. The results are tabulated in **Table 2.37.** It is concluded from the analysis that 39% of Bus passengers are ready to opt for the facility at the same cost and around 23% of all the passengers are ready to opt for the facility at the rate of 1.25 times – 2 times from their present cost of travel. If the new facility cost is above the three times to their present journey cost, nobody is ready to accept the new facility.

Table2.37: Stated Preference and Willingness to pay results (%)

Journey type	Total No of Pass	Same	1.25 times	1.5 times	2 times	3 times	4 times	5 times	>5 times
Trivandrum Bus stand									
Alighting	1302	36%	44%	15%	4%	0%	0%	0%	0%
Boarding	2273	33%	41%	19%	5%	1%	0%	0%	0%
Combined	3575	34%	43%	18%	5%	1%	0%	0%	0%
Trissur Bus stand									
Alighting	930	40%	31%	13%	14%	2%	0%	0%	0%
Boarding	1032	17%	33%	36%	13%	1%	0%	0%	0%
Combined	1962	28%	32%	25%	13%	1%	0%	0%	0%
Kozikode Bus stand									
Alighting	1301	54%	38%	6%	1%	1%	0%	0%	0%
Boarding	1101	47%	41%	10%	2%	0%	0%	0%	0%
Combined	2402	51%	39%	8%	1%	0%	0%	0%	0%
Ernakulum Bus stand									
Alighting	615	51%	20%	14%	14%	0%	0%	0%	0%
Boarding	1123	40%	33%	15%	12%	0%	0%	0%	0%
Combined	1738	44%	28%	14%	13%	0%	0%	0%	0%
Combined Bus Stand									
Alighting	4148	45%	36%	12%	7%	1%	0%	0%	0%
Boarding	5529	34%	38%	20%	7%	1%	0%	0%	0%
Combined	9677	39%	37%	16%	7%	1%	0%	0%	0%

2.6.3. Trip Purpose

An analysis was also carried out to assess the purpose of passenger's trips. **Table 2.38** summarises the purpose-wise trip characteristics of the passengers at all locations.

Table2.38: Purpose wise Trips (%)

Purpose	Work	Business	Education	Social	Recreation	Religious	Others
Arrival	32%	22%	19%	9%	4%	3%	12%
Departure	42%	19%	19%	4%	3%	3%	9%
Combined	38%	20%	19%	6%	4%	3%	10%

- The work and business trips are more than 58 per cent.
- The social and tourist trips are (10 per cent) observed all locations.

2.6.4. Travel Frequency Analysis

An analysis was also carried out to assess the travel frequency of all vehicle modes. **Table 2.39** summarises the travel frequency at all locations.

- Monthly Trip found to be having travel frequency of about 33 per cent and 13 per cent Occasionally.

Table2.39: Travel Frequency Analysis (%)

Frequency	Daily	Monthly	Weekly	Occasionally
Arrival	27%	29%	28%	16%
Departure	21%	35%	33%	12%
Combined	24%	33%	31%	13%

2.6.5. Travel Mode

An analysis was also carried out to assess the travel mode trips. Bus share found more than 57% share w.r.t. other modes.

Table2.40: Travel Mode Analysis (%)

Travel Mode	Car	Taxi	2 Wh	Auto	Sh. Auto	Bus	AC Bus-Govt.	AC Bus-Pvt.	Rail	Cycle	Walk	Other
Arrival	2%	1%	3%	32%	1%	46%	4%	0%	2%	0%	8%	0%
Departure	4%	2%	6%	11%	2%	65%	2%	0%	3%	1%	3%	1%
Combined	3%	2%	4%	20%	2%	57%	3%	0%	3%	0%	5%	1%

2.6.6. Trip Length

An analysis was also carried out to assess the trip length of passenger trips. The details of trip length distribution are presented in the table below.

Table2.41: Trip Length (Km) Distribution (%)

Trip Length	0 – 20	21 - 50	51 - 100	101 - 250	251 - 500	501 - 1000	> 1000
Arrival	82%	8%	4%	4%	1%	0%	0%

Trip Length	0 – 20	21 - 50	51 - 100	101 - 250	251 - 500	501 - 1000	> 1000
Departure	70%	14%	8%	7%	1%	0%	0%
Combined	76%	11%	6%	6%	1%	0%	0%

2.6.7. Travel Cost

An analysis was also carried out to assess the travel cost of passenger trips. The details of travel cost distribution are presented in the table below.

- The 75% of the trips are paying less than Rs. 50/- to reach the travel mode facility.

Table2.42: Travel Cost Analysis (%)

Travel Cost	>= 50	50 to 100	100 to 200	200 to 500	500 to 1000	1000 to 5000	< 5000
Arrival	77%	14%	7%	2%	0%	0%	0%
Departure	74%	14%	9%	2%	0%	0%	0%
Combined	75%	14%	8%	2%	0%	0%	0%

2.6.8. Trips based on Kerala residency and willing to Shift

There are 97% of the total trips belong to the Kerala State and 97% trips wants to shift for the new facility.

Table2.43: Trips based on Kerala residency and willing to Shift (%)

Mode	Kerala residency		willing to Shift	
	Yes	No	Yes	No
Arrival	98%	2%	96%	4%
Departure	97%	3%	99%	1%
Combined	97%	3%	97%	3%

2.6.9. Trip Based on the Occupation

The result is presented below in **Table 2.44**.

Table2.44: Occupation (%)

Journey type	Govt Service	Private Service	Business	Student	Housewife	Retired	Unemployed
Arrival	15%	40%	16%	20%	2%	2%	4%
Departure	13%	48%	13%	20%	2%	2%	2%
Combined	14%	44%	15%	20%	2%	2%	3%

About 73 per cent trips are belonging to the Service and Business class occupation and followed by Students with 20% of trip share.

2.7 Railway Station Survey

2.7.1. Suggestion for Proposed SHSR

The opinion of the users in terms of willingness to pay extra amount for the new facility if they opt, has been taken along with the other information at all the survey locations. The results are tabulated in **Table 2.45.** It is concluded from the analysis that, 44% of the rail passengers are ready to opt for the facility at the same cost and 13% of all the passengers are ready to opt for the facility at the rate of 1.25 times – 2 times for their present cost of travel. If the new facility cost is three times to their present journey cost, nobody is ready to accept the new facility. The Annexures 2.4 attached with this report in excel format.

Table2.45: Stated Preference and Willingness to pay results

Journey type	Total No of Pass	Same	1.25 times	1.5 times	2 times	3 times	4 times	5 times	>5 times
Trivandrum Railway station									
Alighting	2075	25%	39%	20%	15%	1%	0%	0%	0%
Boarding	2025	36%	41%	15%	8%	1%	0%	0%	0%
Combined	4100	30%	40%	17%	11%	1%	0%	0%	0%
Kozikode Railway station									
Alighting	1453	44%	53%	2%	0%	0%	0%	0%	0%
Boarding	1881	38%	51%	9%	2%	0%	0%	0%	0%
Combined	3334	41%	52%	6%	1%	0%	0%	0%	0%
Kollam Railway station									
Alighting	852	48%	40%	11%	0%	0%	0%	0%	0%
Boarding	1298	35%	55%	9%	1%	0%	0%	0%	0%
Combined	2150	40%	49%	9%	1%	0%	0%	0%	0%
Ernakulum Railway station									
Alighting	1036	63%	30%	4%	2%	1%	0%	0%	0%
Boarding	1590	78%	21%	1%	0%	0%	0%	0%	0%
Combined	2626	72%	25%	2%	1%	0%	0%	0%	0%
Combined Railway station									
Alighting	5416	41%	41%	11%	6%	0%	0%	0%	0%
Boarding	6794	46%	42%	9%	3%	0%	0%	0%	0%
Combined	12210	44%	42%	9%	4%	0%	0%	0%	0%

2.7.2. Suggestion for Proposed SHSR

The information has been collected from the road users in such a way that, what they are expecting from the new facility along with other information at all the survey locations. The results are tabulated in **Table 2.46.** 25% of all passengers are expecting the proposed facility overall better than the present system. 22% of all the passengers are expecting the new facility at a less cost than the present system of transportation.

Table2.46: Suggestion for Proposed SHSR

Journey type	Total No of Pass	Comfort	Less Time	Less cost	Reliability	Air condition	Less crowd	Better than Present system
Trivandrum Railway station								
Alighting	2075	47%	29%	8%	14%	0%	0%	1%
Boarding	2025	12%	31%	10%	29%	0%	0%	18%
Combined	4100	30%	30%	9%	22%	0%	0%	10%
Kozikode Railway station								
Alighting	1453	3%	20%	5%	30%	1%	0%	42%
Boarding	1881	63%	11%	1%	16%	0%	2%	6%
Combined	3334	36%	15%	3%	23%	0%	1%	22%
Kollam Railway station								
Alighting	852	53%	8%	0%	0%	0%	0%	39%
Boarding	1298	31%	34%	1%	1%	2%	0%	32%
Combined	2150	40%	24%	0%	1%	1%	0%	34%
Ernakulum Railway station								
Alighting	1036	1%	26%	6%	35%	0%	0%	31%
Boarding	1590	1%	9%	14%	20%	1%	0%	56%
Combined	2626	1%	16%	11%	26%	0%	0%	46%
Combined Railway station								
Alighting	5416	27%	23%	6%	20%	0%	0%	24%
Boarding	6794	27%	21%	7%	18%	1%	0%	26%
Combined	12210	27%	22%	6%	19%	0%	0%	25%

2.7.3. Trip Purpose

An analysis was also carried out to assess the purpose of passenger's trips. **Table 2.47** summarises the purpose-wise trip characteristics of the passengers at all locations.

Table2.47: Purpose wise Trips (%)

Purpose	Work	Business	Education	Social	Recreation	Religious	Others
Arrival	35%	20%	20%	8%	3%	4%	11%
Departure	36%	26%	16%	7%	3%	2%	10%
Combined	36%	23%	18%	7%	3%	3%	10%

- The work and business trips are more than 59 per cent and followed by Education Trips with 18% share.
- The social and tourist trips are (10 per cent) observed all locations.

2.7.4. Travel Frequency Analysis

An analysis was also carried out to assess the travel frequency of all vehicle modes. **Table 2.48** summarises the travel frequency at all locations.

- Monthly Trip found to be having travel frequency of about 36 per cent and followed by weekly trip share (33%).

Table2.48: Travel Frequency Analysis (%)

Frequency	Daily	Monthly	Weekly	Occasionally
Arrival	17%	32%	40%	11%
Departure	30%	39%	27%	5%
Combined	24%	36%	33%	8%

2.7.5. Travel Mode

An analysis was also carried out to assess the travel mode trips. The Bus trip share found 37% w.r.t. other modes.

Table2.49: Travel Mode Analysis (%)

Travel Mode	Car	Taxi	2 Wh	Auto	Sh. Auto	Bus	AC Bus-Govt.	AC Bus-Pvt.	Rail	Cycle	Walk	Other
Arrival	11%	12%	14%	13%	1%	44%	0%	0%	2%	0%	2%	0%
Departure	11%	14%	20%	13%	2%	31%	1%	0%	1%	0%	6%	0%
Combined	11%	13%	17%	13%	1%	37%	1%	0%	2%	0%	4%	0%

2.7.6. Trip Length

An analysis was also carried out to assess the trip length of passenger trips. The details of trip length distribution are presented in the table below.

Table2.50: Trip Length (Km) Distribution (%)

Trip Length	0 – 20	21 - 50	51 - 100	101 - 250	251 - 500	501 - 1000	> 1000
Arrival	92%	7%	1%	0%	0%	0%	0%
Departure	87%	12%	1%	0%	0%	0%	0%
Combined	89%	10%	1%	0%	0%	0%	0%

2.7.7. Travel Cost

An analysis was also carried out to assess the travel cost of passenger trips. The details of travel cost distribution are presented in the table below.

- The 76% of the trips are paying Rs. 50/- to reach the travel mode facility.

Table2.51: Travel Cost Analysis (%)

Travel Cost	>= 50	50 to 100	100 to 200	200 to 500	500 to 1000	1000 to 5000	< 5000
Arrival	71%	14%	8%	6%	1%	0%	0%
Departure	80%	15%	3%	2%	0%	0%	0%
Combined	76%	14%	6%	4%	0%	0%	0%

2.7.8. Trips based on Kerala residency and willing to Shift

There are 96% of the total trips belong to the Kerala State and 98% trips wants to shift for the new facility.

Table2.52: Trips based on Kerala residency and willing to Shift (%)

Mode	Kerala residency		willing to Shift	
	Yes	No	Yes	No
Arrival	94%	6%	97%	3%
Departure	97%	3%	99%	1%
Combined	96%	4%	98%	2%

2.7.9. Trip Based on the Occupation

The result is presented below in **Table 2.53**.

Table2.53: Occupation (%)

Journey type	Govt Service	Private Service	Business	Student	Housewife	Retired	Unemployed
Arrival	17%	31%	16%	20%	4%	6%	6%
Departure	23%	36%	19%	14%	3%	2%	3%
Combined	20%	34%	17%	17%	4%	4%	4%

About 71 per cent trips are belonging to the Service and Business class occupation.

2.8 Truck Operator Surveys

2.8.1. Willingness to Shift to SHSR

Willingness to shift to new facility survey has been conducted and truck operators are questioned for their will to shift to new facility at different locations along the project corridor and the results are tabulated in **Table 2.29** and in **Figure 2.4**. As per the survey data, 27% of the truck operators are probably ready to shift to new facility.

Table2.54: Willingness to Shift to SHSR Results (%)

Location	Definitely Yes	Probably Yes	Can't Say	Probably No	Definitely No
Alapuza	0%	7%	76%	17%	0%
Chertala	0%	0%	25%	75%	0%
Coimbature	0%	0%	15%	46%	38%
Ernakulam	0%	36%	18%	46%	0%
Haripad	0%	18%	0%	82%	0%
Kannur	0%	43%	33%	24%	0%
Kasargod	50%	50%	0%	0%	0%
Kayamkulam	0%	10%	40%	50%	0%
Kochi	0%	54%	30%	15%	0%
Kollam	0%	28%	34%	38%	0%
Kozikode	0%	24%	45%	31%	0%
Mangalore	0%	19%	31%	44%	6%
Nagarkoil	0%	29%	57%	14%	0%
Thalasery	0%	11%	0%	89%	0%
Trivandrum	53%	23%	23%	0%	0%
All locations	6%	27%	34%	31%	2%

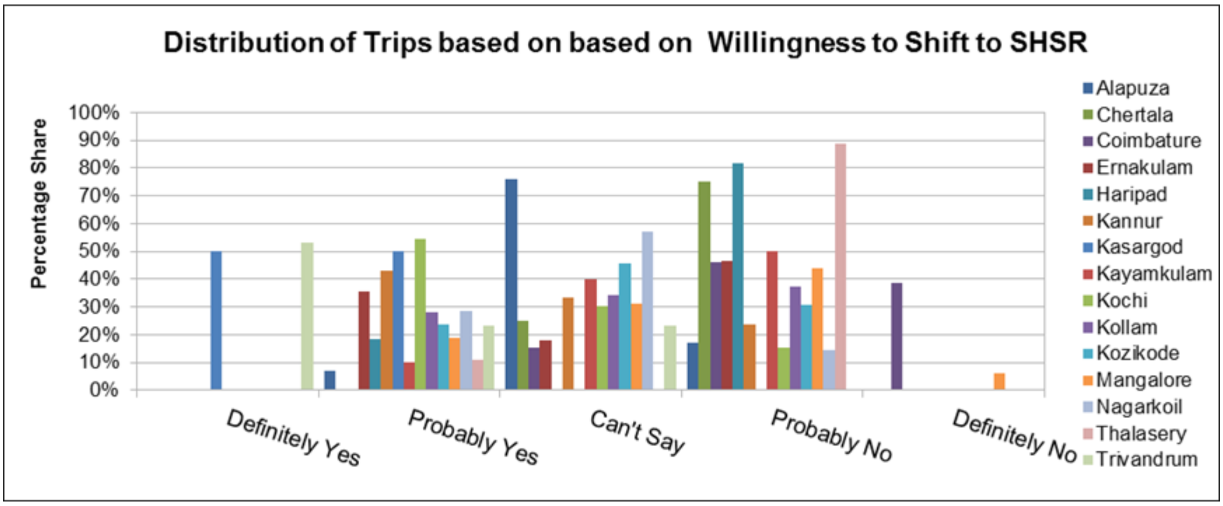


Figure2.4: Willingness to Shift to SHSR Results

2.8.2. Freight charge willing to pay for 500km in RORO Service

Willingness to pay for new facility survey has been conducted and truck operators are questioned for their will to shift to new facility at different locations along the project corridor and the results are tabulated in **Table 2.55**. As per the survey data, 71% of the truck operators are ready to shift to new facility but half of present cost followed by ¾ cost.

Table2.55: Freight charge willing to pay for 500km in RORO Service (%)

Location	Half of Present Charge	3/4 of Present Charge	Same Charge	One and 1/2 Charge	Double
Alapuza	48%	52%	0%	0%	0%
Chertala	75%	25%	0%	0%	0%
Coimbature	0%	15%	85%	0%	0%
Ernakulam	50%	50%	0%	0%	0%
Haripad	100%	0%	0%	0%	0%
Kannur	81%	19%	0%	0%	0%
Kasargod	100%	0%	0%	0%	0%
Kayamkulam	100%	0%	0%	0%	0%
Kochi	76%	24%	0%	0%	0%
Kollam	100%	0%	0%	0%	0%
Kozikode	84%	13%	4%	0%	0%
Mangalore	44%	6%	50%	0%	0%
Nagarkoil	86%	14%	0%	0%	0%
Thalasery	33%	0%	67%	0%	0%
Trivandrum	77%	23%	0%	0%	0%
All Locations	71%	20%	9%	0%	0%

2.8.3. Distribution of Trip based on Mode of transport

As per the survey data, 39% of the Trips are made by MAV truck and followed by the 2-3 Axle Trucks (36%). the results are tabulated in **Table 2.56.**

Table2.56: Distribution of Trip based on Mode of transport (%)

Location	Tempo	LCV	2-3 Axle Truck	Multi Axle Truck (MAV)
Alapuza	0%	0%	34%	66%
Chertala	0%	25%	75%	0%
Coimbature	8%	15%	31%	46%
Ernakulam	11%	43%	32%	14%
Haripad	9%	18%	18%	55%
Kannur	5%	19%	24%	48%
Kasargod	0%	0%	50%	50%
Kayamkulam	0%	20%	40%	50%
Kochi	11%	24%	39%	26%
Kollam	0%	22%	53%	25%
Kozikode	5%	13%	38%	44%
Mangalore	13%	13%	13%	63%
Nagarkoil	0%	14%	43%	43%
Thalasery	0%	56%	33%	11%
Trivandrum	7%	20%	30%	43%
All Locations	6%	20%	36%	39%

2.8.4. Distribution of Trip Based on Commodity

There are around 31% of Trips are made by the operater for household Goods and the results are tabulated in **Table 2.57.**

Table2.57: Commodity Distribution (%)

Location	Building Materials	Agricultural Products/Milk/Fish	Chemicals/Fertilisers	Petroleum Products	Textile	Manufactured/Electronic Goods	House Hold Goods	Construction Materials	Machinery	Iron & Steel	Minerals & Ores	Automobiles	Empty	Others
Alapuza	0%	14%	10%	0%	7%	10%	24%	0%	14%	3%	14%	0%	0%	3%
Chertala	0%	50%	0%	0%	0%	25%	25%	0%	0%	0%	0%	0%	0%	0%
Coimbature	0%	23%	0%	0%	0%	23%	23%	0%	8%	0%	15%	8%	0%	0%
Ernakulam	0%	25%	0%	0%	4%	11%	43%	0%	7%	0%	4%	4%	0%	4%
Haripad	0%	36%	0%	0%	0%	9%	18%	0%	9%	0%	18%	9%	0%	0%
Kannur	0%	29%	0%	0%	10%	5%	29%	0%	10%	0%	5%	14%	0%	0%
Kasargod	0%	25%	25%	25%	0%	25%	0%	0%	0%	0%	0%	0%	0%	0%
Kayamkulam	0%	30%	0%	0%	0%	10%	20%	0%	10%	0%	10%	10%	0%	10%
Kochi	0%	26%	0%	0%	7%	2%	39%	0%	9%	2%	7%	4%	0%	4%
Kollam	0%	25%	0%	0%	3%	6%	31%	0%	13%	3%	6%	13%	0%	0%
Kozikode	0%	33%	7%	0%	0%	7%	42%	0%	2%	2%	5%	0%	0%	2%
Mangalore	0%	38%	0%	0%	13%	6%	38%	0%	0%	0%	6%	0%	0%	0%
Nagarkoil	0%	43%	0%	14%	0%	0%	43%	0%	0%	0%	0%	0%	0%	0%
Thalasery	0%	22%	11%	0%	0%	11%	44%	0%	11%	0%	0%	0%	0%	0%
Trivandrum	47%	17%	10%	7%	3%	0%	7%	10%	0%	0%	0%	0%	0%	0%
All Locations	4%	27%	4%	1%	4%	7%	31%	1%	7%	1%	6%	4%	0%	2%

2.8.5. Distribution of Trip based on Gross Weight

The results are tabulated in **Table 2.58.**

Table2.58: Distribution of Trip based on Gross Weight in Tons (%)

Location	Less than 5t	5 to 10t	10 to 20t	20 to 50t	50 to 100t	Greater than 100t
Alapuza	0%	0%	38%	62%	0%	0%
Chertala	0%	25%	75%	0%	0%	0%
Coimbature	8%	15%	31%	46%	0%	0%
Ernakulam	50%	0%	32%	18%	0%	0%
Haripad	18%	9%	18%	55%	0%	0%
Kannur	5%	19%	19%	57%	0%	0%
Kasargod	0%	0%	50%	50%	0%	0%
Kayamkulam	0%	10%	40%	50%	0%	0%
Kochi	24%	15%	35%	26%	0%	0%
Kollam	6%	19%	50%	25%	0%	0%
Kozikode	7%	9%	40%	44%	0%	0%
Mangalore	19%	6%	13%	63%	0%	0%
Nagarkoil	14%	0%	43%	43%	0%	0%
Thalasery	22%	33%	33%	11%	0%	0%
Trivandrum	19%	19%	52%	52%	0%	0%
All Locations	14%	11%	36%	39%	0%	0%

2.8.6. Distribution of Trip based on Freight Charges

There are 9% of the Trips are wearing the freight charges above 50,000/-. The results are tabulated in **Table 2.59.**

Table2.59: Freight Charges (%)

Location	less than 10000	10000 to 50000	50000 to 100000	100000 to 150000	more than 150000
Alapuza	24%	69%	7%	0%	0%
Chertala	25%	75%	0%	0%	0%
Coimbature	31%	54%	15%	0%	0%
Ernakulam	79%	21%	0%	0%	0%
Haripad	36%	64%	0%	0%	0%
Kannur	62%	38%	0%	0%	0%
Kasargod	0%	100%	0%	0%	0%
Kayamkulam	80%	20%	0%	0%	0%
Kochi	65%	35%	0%	0%	0%
Kollam	41%	56%	3%	0%	0%
Kozikode	20%	53%	24%	4%	0%
Mangalore	25%	56%	19%	0%	0%
Nagarkoil	29%	71%	0%	0%	0%
Thalasery	67%	22%	11%	0%	0%
Trivandrum	47%	43%	7%	3%	0%
All Locations	44%	47%	8%	1%	0%

2.9 Freight Forward Agency Survey

2.9.1. Willingness to Shift to SHSR

Willingness to shift to new facility survey has been conducted and Freight Forward Agencies are questioned for their will to shift to new facility at different locations along the project corridor and the results are tabulated in **Table 2.60** and in **Figure 2.5**. As per the survey data, 38% of the operators are probably ready to shift to new facility.

Table2.60: Willingness to Shift to SHSR Results (%)

Location	Definitely Yes	Probably Yes	Can't Say	Probably No	Definitely No
Alapuza	33%	41%	26%	0%	0%
Chertala	0%	70%	20%	10%	0%
Coimbature	0%	0%	80%	20%	0%
Ernakulam	0%	0%	100%	0%	0%
Haripad	0%	43%	43%	14%	0%
Kannur	0%	29%	57%	14%	0%
All locations	18%	38%	39%	5%	0%

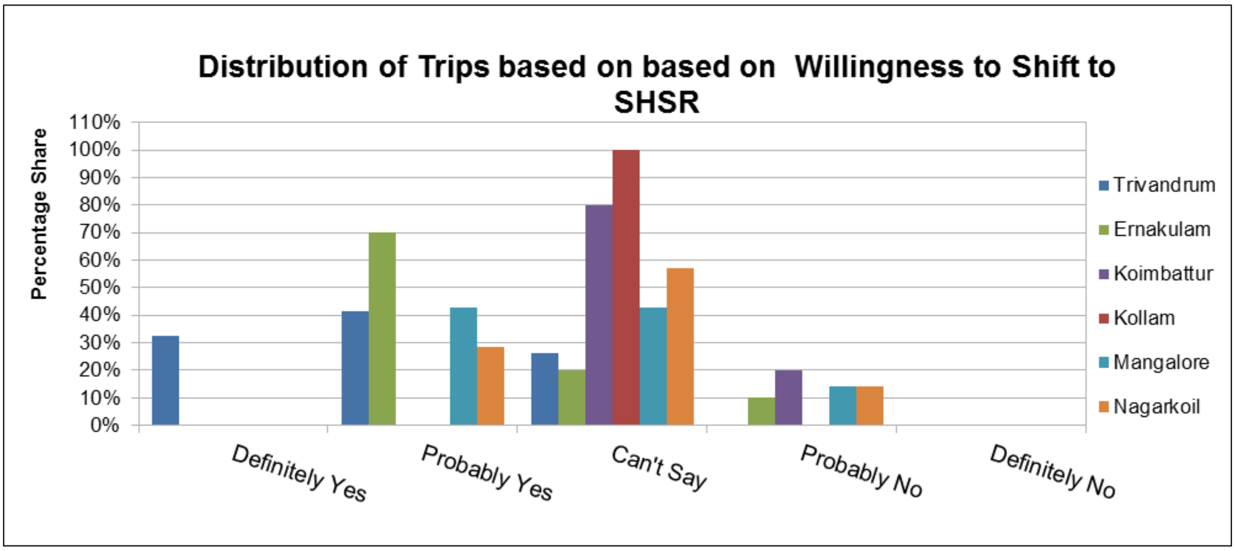


Figure2.5: Willingness to Shift to SHSR Results

2.9.2. Freight Charge Willing To Pay

Willingness to pay for new facility survey has been conducted and the operators are questioned for their will to pay for the new facility at different locations along the project corridor and the results are tabulated in **Table 2.61**. As per the survey data, 78% of the truck operators are ready to shift to new facility but half of present cost followed by ¾ of present charges (17%).

Table2.61: Freight charge willing to pay for 500km in RORO Service (%)

Location	Half of Present Charge	3/4 of Present Charge	Same Charge	One and 1/2 Charge	Double
Alapuza	63%	30%	0%	7%	0%
Chertala	100%	0%	0%	0%	0%
Coimbature	80%	0%	20%	0%	0%
Ernakulam	100%	0%	0%	0%	0%
Haripad	100%	0%	0%	0%	0%
Kannur	100%	0%	0%	0%	0%
All locations	78%	17%	1%	4%	0%

2.9.3. Distribution of Trip based on Mode of transport

As per the survey data, 43% of the Trips are made by 2-3 Axle Trucks and followed by the MAV truck (38%). the results are tabulated in **Table 2.62.**

Table2.62: Distribution of Trip based on Mode of transport (%)

Location	Tempo	LCV	2-3 Axle Truck	Multi Axle Truck (MAV)
Alapuza	7%	20%	37%	37%
Chertala	0%	10%	60%	30%
Coimbature	0%	0%	40%	60%
Ernakulam	0%	29%	57%	14%
Haripad	0%	0%	43%	57%
Kannur	0%	14%	43%	43%
All locations	4%	16%	43%	38%

2.9.4. Distribution of Trip Based on Commodity

There are around 29% of Trips are made by the operator for household Goods and the detailed results are tabulated in **Table 2.63.**

Table2.63: Commodity Distribution (%)

Location	Household Items	Electonic items	Raw materilals/ Spare Parts	Textile/ Readymade	Stationary items	Decorative Items	Automobiles	Others
Alapuza	41%	11%	13%	11%	7%	0%	7%	11%
Chertala	0%	50%	0%	0%	10%	10%	0%	30%
Coimbature	40%	0%	20%	0%	0%	0%	40%	0%
Ernakulam	0%	14%	0%	0%	0%	14%	43%	29%
Haripad	43%	14%	0%	29%	14%	0%	0%	0%
Kannur	0%	29%	0%	14%	0%	0%	0%	57%
All locations	29%	17%	9%	10%	6%	2%	10%	17%

2.9.5. Distribution of Trip based on Gross Weight

The results are tabulated in **Table 2.64.**

Table2.64: Distribution of Trip based on Gross Weight in Tons (%)

Location	Less than 5t	5 to 10t	10 to 20t	20 to 50t	50 to 100t	Greater than 100t
Alapuza	11%	17%	30%	41%	0%	0%
Chertala	10%	0%	60%	30%	0%	0%
Coimbature	0%	0%	40%	60%	0%	0%
Ernakulam	0%	29%	57%	14%	0%	0%
Haripad	0%	0%	43%	57%	0%	0%
Kannur	14%	0%	43%	43%	0%	0%
All locations	9%	12%	39%	40%	0%	0%

2.9.6. Distribution of Trip Length

There are 56% of the Trips has above 500kms. The results are tabulated in **Table 2.65.**

Table2.65: Trip Length (%)

Location	0 – 20	21 - 50	51 - 100	101 - 250	251 - 500	501 - 1000	> 1000
Alapuza	0%	0%	13%	17%	11%	17%	41%
Chertala	0%	0%	0%	0%	30%	10%	60%
Coimbature	0%	0%	0%	20%	60%	0%	20%
Ernakulam	0%	0%	14%	43%	29%	14%	0%
Haripad	0%	0%	0%	14%	14%	71%	0%
Kannur	0%	0%	0%	0%	29%	71%	0%
All locations	0%	0%	9%	16%	20%	24%	32%

2.9.7. Distribution of Trip based on Freight Charges

There are 19% of the Trips are wearing the freight charges above 50,000/-. The results are tabulated in **Table 2.66.**

Table2.66: Freight Charges (%)

Location	less than 10000	10000 to 50000	50000 to 100000	100000 to 150000	more than 150000
Alapuza	48%	24%	17%	11%	0%
Chertala	80%	20%	0%	0%	0%
Coimbature	0%	80%	20%	0%	0%
Ernakulam	14%	71%	14%	0%	0%
Haripad	0%	86%	14%	0%	0%
Kannur	0%	100%	0%	0%	0%
All locations	38%	43%	13%	6%	0%

2.10 Railway Operator Survey

2.10.1. Distribution of Trip Based on Commodity

There are around 29% of Trips are made by the operator for household Goods and the detailed results are tabulated in **Table 2.67.**

Table2.67: Commodity Distribution (%)

Location	Household Items	Electonic items	Raw materilals/ Spare Parts	Textile/ Readymade	Stationary items	Decorative Items	Automobiles	Others
Ernakulam	40%	0%	20%	20%	0%	0%	20%	0%
Kannur	33%	0%	100%	0%	0%	0%	33%	0%
Kesargod	57%	29%	14%	0%	0%	0%	0%	0%
Kollam	40%	0%	20%	20%	20%	0%	0%	0%
Kazikode	57%	14%	0%	0%	0%	0%	29%	0%
Trisuur	60%	20%	0%	0%	20%	0%	0%	0%
Trivandrum	67%	0%	0%	0%	0%	0%	33%	0%
All locations	51%	11%	17%	6%	6%	0%	14%	0%

2.10.2. Distribution of Trip based on Gross Weight

The results are tabulated in **Table 2.68.**

Table2.68: Distribution of Trip based on Gross Weight in Tons (%)

Location	Less than 5t	5 to 10t	10 to 20t	20 to 50t	50 to 100t	Greater than 100t
Ernakulam	0%	0%	0%	0%	100%	0%
Kannur	0%	0%	0%	33%	33%	33%
Kesargod	0%	29%	0%	29%	14%	29%
Kollam	0%	0%	0%	20%	40%	40%
Kazikode	0%	0%	0%	14%	14%	71%
Trisuur	0%	0%	0%	20%	20%	60%
Trivandrum	0%	0%	0%	33%	67%	0%
All locations	0%	6%	0%	20%	37%	37%

2.10.3. Distribution of Trip Length

There are 29% of the Trips has above 500kms. The results are tabulated in **Table 2.69.**

Table2.69: Trip Length (%)

Location	0 – 20	21 - 50	51 - 100	101 - 250	251 - 500	501 - 1000	> 1000
Ernakulam	0%	0%	0%	0%	0%	0%	100%
Kannur	0%	0%	33%	0%	33%	0%	33%

Location	0 – 20	21 - 50	51 - 100	101 - 250	251 - 500	501 - 1000	> 1000
Kesargod	0%	14%	0%	29%	43%	14%	0%
Kollam	0%	0%	40%	60%	0%	0%	0%
Kazikode	0%	0%	0%	29%	57%	0%	14%
Trisuur	20%	20%	0%	40%	20%	0%	0%
Trivandrum	0%	0%	0%	0%	33%	33%	33%
All locations	3%	6%	9%	26%	29%	6%	23%

2.10.4.Distribution of Trip based on Freight Charges

There are 14% of the Trips are wearing the freight charges above 1,50,000/-. The results are tabulated in **Table 2.70.**

Table2.70: Freight Charges (%)

Location	less than 10000	10000 to 50000	50000 to 100000	100000 to 150000	more than 150000
Ernakulam	0%	0%	0%	0%	100%
Kannur	67%	0%	33%	0%	0%
Kesargod	29%	57%	14%	0%	0%
Kollam	80%	20%	0%	0%	0%
Kazikode	43%	57%	0%	0%	0%
Trisuur	60%	40%	0%	0%	0%
Trivandrum	0%	100%	0%	0%	0%
All locations	40%	40%	6%	0%	14%

2.10.5. Railway Parcel Secondary Data

Trivandrum

The results are tabulated in **Table 2.71.** There is negative growth in parcel (-0.84%) and in Revenue (-8.33%). But there is growth in OW with 5.71%.

Table2.71: Freight Charges (%)

Year	Data received (number)			Data Analysis (%)		
	No. of Parcels	OW WT (Q)	Revenue	Growth parcels (%)	Growth OW WT(Q)(%)	Growth Revenue (%)
2014	61,356	17,401	67,194,665			
2015	78,968	24,863	73,947,132	28.70	42.88	10.05
2016	91,103	31,860	62,783,759	15.37	28.14	-15.10
2017	90,002	34,190	57,408,096	-1.21	7.31	-8.56
2018	89,250	36,142	52,623,569	-0.84	5.71	-8.33
2019	18,316	7,584	14,362,605	Data is available for 3months only		

Thrissur

The results are tabulated in **Table 2.72.** There is growth in parcel with 1.43%(-0.84%), but there is negative growth in Revenue with -2.46%.

Table2.72: Freight Charges (%)

Year	Data received (number)		Data Analysis (%)	
	No. of Parcels	Revenue	Growth parcels (%)	Growth Revenue (%)
2014	6,028	5,359,389		
2015	8,349	7,977,833	38.50	48.86
2016	8,929	9,404,952	6.95	17.89
2017	8,966	11,414,855	0.41	21.37
2018	9,036	11,935,091	0.78	4.56
2019##	9,165	11,642,040	1.43	-2.46

## for 2019 there is 10 months data available.

Kozhikode

The results are tabulated in **Table 2.73.** There is growth in revenue with 25.91%(-0.84%), but there is negative growth in Parcel with -17.53%.

Table2.73: Freight Charges (%)

Year	Data received (number)		Data Analysis (%)	
	No. of Parcels	Revenue	Growth parcels (%)	Growth Revenue (%)
2016-17	3657	4195140		
2017-18	2864	3616722	-21.68	-13.79
2018-19	1865	2181540	-34.88	-39.68
2019-20##	1538	2746750	-17.53	25.91

## for 2019 there is 9 months data available.

Ernakulam

There is only revenue time series data available from 2015 to 2018.

The results are tabulated in **Table 2.74.**

Table2.74: Freight Charges (%)

Year	Data Analysed	
	Revenue (number)	Growth Revenue (%)
2015	6330118	
2016	16934889	167.53
2017	15507345	-8.43
2018##	1592360	NA

## for 2019 there is only January months data available.

Kannur

There is only two month revenue data available from December 2019 (Rs. 9,51,612/-) to January 2020 (Rs. 2,43,497/-). The negative growth is observed with -74.41%.

2.11 On Board Survey

2.11.1.Stated preference and willingness to pay surveys

In general transportation planning, surveys are meant to capture travelers' current travel behavior. For instance, one is interested in knowing the actual mode a traveler is using, actual travel times, destinations, and so forth. This is known as Revealed Preference (RP) data, as the traveler is currently experiencing that behavior and making a choice based on his or her knowledge of the available travel options. Another type of data is based on Stated Responses (SR), in which hypothetical situations are presented to the respondents, who are then asked to choose based on the given attributes for each alternative, without necessarily experiencing them in real situations. SP is a very popular sub-class of SR methods, focused on estimating the utility function for alternatives. Stated preference and willingness to pay surveys for the proposed "Trivandrum to Kasargod Semi-High Speed Rail Corridor" have been conducted along the corridor at different airports, railway stations and at bus terminals for different economy level people for the options like Definitely Prefer Present Mode, Possibly Prefer Present Mode, Indifferent option, Possibly Prefer SHSR, Definitely Prefer SHSR and no response. Results are tabulated in **Table 2.75** and in **Figure 2.6**. From the Table, it is concluded that 40% of the commuters are showing interest in the proposed facility for the given options.

Table2.75: Stated Preference and Willingness to pay results

S.No.	Stated preference results	Rail passengers	Bus passengers	Air Passengers
1	Definitely Prefer Present Mode	15%	17%	14%
2	Possibly Prefer Present Mode	13%	19%	11%
3	Indifferent	2%	4%	3%
4	Possibly Prefer SHSR	25%	28%	22%
5	Definitely Prefer SHSR	41%	29%	43%
6	No Response	3%	3%	6%
	Total	**100%**	**100%**	**100%**

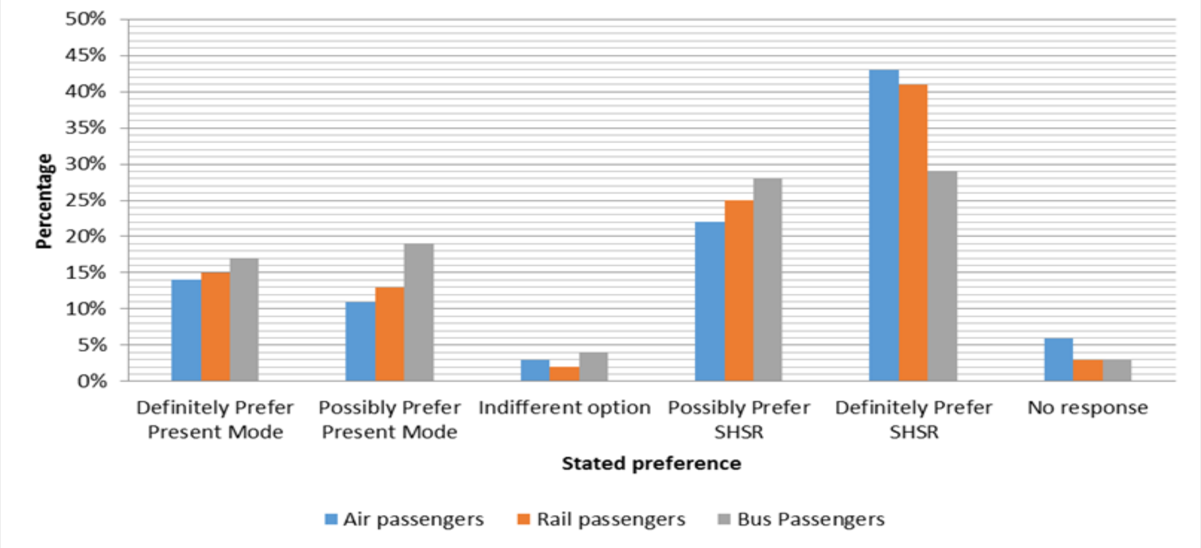


Figure2.6: Stated Preference and Willingness to pay results

2.11.2. Distribution of Trip Based on Age of Passenger

There are around 50% of Trips are made by the 25 -44 age group and followed by 45-60 age group. The detailed results are tabulated in **Table 2.76.**

Table2.76: Age of Passenger (%)

Location	Total no. surveyed	<25	25-44	45-60	>60
Airport	172	5%	58%	36%	1%
Bus	526	4%	53%	22%	0%
Train	436	5%	43%	49%	3%
Combined	1134	5%	50%	35%	1%

2.11.3. Distribution of Trip based on Monthly Income

The major trips shares (37%) are generated by the middle income group. The results are tabulated in **Table 2.77.**

Table2.77: Distribution of Trip based on Monthly Income (%)

Location	<10000	10001-20000	20001-35000	35001-50000	50001-75000	75001-100000	100000-200000	>200000
Airport	0%	3%	16%	32%	24%	18%	7%	0%
Bus	0%	9%	49%	20%	2%	1%	0%	0%
Train	0%	2%	20%	59%	11%	6%	1%	0%
Combined	0%	5%	33%	37%	8%	5%	1%	0%

2.11.4. Distribution of Trip Purpose

The results are tabulated in **Table 2.78.** The work and Business Trip purpose having major share w.r.t. other trips.

Table2.78: Trip Purpose (%)

Location	Work	Business	Education	Social	Health	Tourism	Other
Airport	52%	33%	2%	7%	3%	3%	0%
Bus	41%	25%	2%	10%	3%	1%	1%
Train	38%	44%	0%	11%	3%	4%	1%
Combined	41%	33%	1%	10%	3%	2%	1%

2.11.5. Distribution of Trip based on Amount Spent

The results are tabulated in **Table 2.79.**

Table2.79: Amount Spent (%)

Location	<100	100-500	500-1000	1000-2000	2000-5000	5000-10000	>10000
Airport	0%	0%	0%	5%	28%	31%	35%
Bus	27%	21%	23%	9%	0%	0%	0%
Train	0%	31%	41%	17%	9%	2%	0%
Combined	13%	22%	27%	11%	8%	5%	5%

2.11.6. Distribution of Trip based on Trip Frequency

The results are tabulated in **Table 2.80.** Monthly trips are on higher side than other trip frequency.

Table2.80: Distribution of Trip based on Trip Frequency (%)

Location	Daily	Weekly	Monthly	Occasionally
Airport	0%	2%	27%	70%
Bus	10%	23%	38%	9%
Train	0%	28%	54%	17%
Combined	5%	22%	43%	22%

2.11.7. Distribution of Trips based on Opinion about proposed SHSR System

The results are tabulated in **Table 2.81.**

Table2.81: Opinion about proposed SHSR System (%)

Location	Likely	Can't Say	Not Likely
Airport	8%	0%	0%
Bus	72%	8%	0%
Train	95%	5%	0%
Combined	71%	5%	0%

Annexures

Annexure 1: Average Daily Traffic - TVC 01 Thottakadu

Day Wise Both Direction Traffic Data at TVC 01 Thottakadu

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/19/2019	16613	628	281	53	1172	81	179	172	4	12340	2108	1472	1374	638	563	2	16	33631	4065	37696	0	37696	38727
9/20/2019	18042	1020	382	76	1117	74	380	183	8	13124	1933	1578	1389	746	535	0	2	36339	4250	40589	0	40589	41686
9/21/2019	18113	852	463	62	730	168	509	19	0	11560	1984	1255	1030	624	363	0	1	34460	3273	37733	0	37733	38169
ADT (Kollam-Thiruvananthapuram)	8793	361	173	25	506	43	187	59	2	6074	961	691	645	356	234	0	2	17184	1928	19112	0	19112	19578
ADT (Thiruvananthapuram-Kollam)	8797	472	202	38	501	64	169	66	2	6267	1048	744	619	313	253	0	5	17626	1934	19560	0	19560	19947
AADT (Kollam-Thiruvananthapuram)	8728	356	171	25	506	42	185	58	2	5995	949	682	637	351	231	0	2	17017	1903	18920	0	18920	19393
AADT (Thiruvananthapuram-Kollam)	8732	466	199	38	501	63	167	65	2	6186	1034	734	611	309	250	0	5	17453	1909	19362	0	19362	19759

Annexure 1: Average Daily Traffic - TVC 02 Kilimanoor

Day Wise Both Direction Traffic Data at TVC 02 Kilimanoor

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/19/2019	14558	689	243	29	868	83	167	68	4	10445	2597	1131	652	480	229	0	1	29751	2493	32244	0	32244	31570
9/20/2019	14520	852	296	16	811	62	242	80	5	11073	2681	1087	852	395	268	1	0	30638	2603	33241	0	33241	32322
9/21/2019	15841	754	332	41	953	25	98	14	0	9944	2429	1022	664	295	243	0	0	30431	2224	32655	0	32655	31863
ADT (Kollam-Thiruvananthapuram)	7981	398	144	16	445	30	79	23	2	5454	1309	564	391	225	155	0	0	15881	1335	17216	0	17216	16905
ADT (Thiruvananthapuram-Kollam)	6992	367	146	12	432	27	90	31	1	5034	1260	516	331	165	91	0	0	14392	1103	15495	0	15495	15005
AADT (Kollam-Thiruvananthapuram)	7922	393	142	16	445	30	78	23	2	5383	1292	557	386	222	153	0	0	15726	1318	17044	0	17044	16750
AADT (Thiruvananthapuram-Kollam)	6940	362	144	12	432	27	89	31	1	4969	1244	509	327	163	90	0	0	14251	1089	15340	0	15340	14870

Annexure 1: Average Daily Traffic - TVC 03 Karunagapally

Day Wise Both Direction Traffic Data at TVC 03 Karunagapally

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/22/2019	20450	784	424	52	982	92	421	39	2	26545	2931	1190	682	505	570	0	1	52722	2948	55670	0	55670	49077
9/23/2019	18730	775	307	57	1062	88	231	173	2	36503	4181	2393	1401	825	820	2	0	62109	5441	67550	0	67550	57646
9/24/2019	16761	721	293	61	1027	101	247	131	0	32944	3936	2530	1670	886	744	5	0	56222	5835	62057	0	62057	53898
ADT (Chengannur-Kollam)	9124	373	163	27	505	43	155	54	1	15521	1807	1034	668	378	408	2	0	27773	2490	30263	0	30263	26598
ADT (Kollam-Chengannur)	9523	387	178	30	518	50	145	60	0	16476	1876	1003	583	361	303	1	0	29243	2251	31494	0	31494	26939
AADT (Chengannur-Kollam)	9056	368	161	27	505	42	153	53	1	15319	1784	1021	659	373	403	2	0	27469	2458	29927	0	29927	26324
AADT (Kollam-Chengannur)	9452	382	176	30	518	49	143	59	0	16262	1852	990	575	356	299	1	0	28923	2221	31144	0	31144	26660

Annexure 1: Average Daily Traffic - TVC 04 Sasthacotta

Day Wise Both Direction Traffic Data at TVC 04 Sasthacotta

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/19/2019	4841	344	107	2	331	4	366	83	16	14116	1309	709	290	177	128	0	0	21519	1304	22823	0	22823	18245
9/20/2019	4930	384	101	0	347	4	357	71	0	14918	1394	644	292	146	116	0	0	22506	1198	23704	0	23704	18591
9/21/2019	5339	281	52	0	483	1	183	5	0	12332	971	660	301	96	112	0	0	19647	1169	20816	0	20816	16747
ADT (Chengannur-Kollam)	2501	171	37	1	195	2	153	29	3	6803	614	325	139	67	65	0	0	10509	596	11105	0	11105	8876
ADT (Kollam-Chengannur)	2536	166	50	0	192	1	149	24	2	6986	611	346	155	72	53	0	0	10717	626	11343	0	11343	8982
AADT (Chengannur-Kollam)	2482	169	37	1	195	2	151	29	3	6715	606	321	137	66	64	0	0	10390	588	10978	0	10978	8782
AADT (Kollam-Chengannur)	2517	164	49	0	192	1	147	24	2	6895	603	342	153	71	52	0	0	10594	618	11212	0	11212	8886

Annexure 1: Average Daily Traffic - TVC 05 Adoor Bypass

Day Wise Both Direction Traffic Data at TVC 05 Adoor Bypass

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/22/2019	10860	579	212	0	9	37	96	4	51	5169	571	54	734	196	161	0	0	17588	1145	18733	0	18733	17965
9/23/2019	8777	529	135	0	7	36	36	32	92	5525	713	108	1449	578	284	1	2	15882	2422	18304	0	18304	18852
9/24/2019	8190	546	126	0	20	53	47	30	34	5162	725	140	1542	490	294	0	0	14933	2466	17399	0	17399	17984
ADT (Chengannur-Kollam)	4472	285	87	0	6	8	27	9	31	2529	326	45	585	185	154	0	0	7780	969	8749	0	8749	8878
ADT (Kollam-Chengannur)	4803	266	71	0	6	34	33	13	28	2757	343	56	657	236	92	0	1	8354	1042	9396	0	9396	9388
AADT (Chengannur-Kollam)	4439	281	86	0	6	8	27	9	31	2496	322	44	577	183	152	0	0	7705	956	8661	0	8661	8791
AADT (Kollam-Chengannur)	4767	263	70	0	6	34	33	13	28	2721	339	55	648	233	91	0	1	8274	1028	9302	0	9302	9297

Annexure 1: Average Daily Traffic - TVC 06 Enjhiljilam

Day Wise Both Direction Traffic Data at TVC 06 Enjhiljilam

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/22/2019	15308	577	341	43	798	118	152	9	0	7105	861	809	473	337	322	4	7	25312	1952	27264	0	27264	28185
9/23/2019	12249	661	222	31	874	57	170	60	0	10399	1369	1531	1024	726	616	0	0	26092	3897	29989	0	29989	31315
9/24/2019	12090	651	192	39	948	45	102	50	0	8903	1280	1551	1023	696	595	0	2	24300	3867	28167	0	28167	30098
ADT (Chingannur-Kotayam)	6688	336	119	16	436	41	82	20	0	4521	592	656	450	320	256	1	1	12851	1684	14535	0	14535	15262
ADT (Kotayam-Chingannur)	6528	294	133	22	437	32	59	20	0	4282	578	641	390	267	255	0	2	12385	1555	13940	0	13940	14604
AADT (Chingannur-Kotayam)	6638	332	117	16	436	40	81	20	0	4462	584	647	444	316	253	1	1	12726	1662	14388	0	14388	15118
AADT (Kotayam-Chingannur)	6480	290	131	22	437	32	58	20	0	4226	570	633	385	264	252	0	2	12266	1536	13802	0	13802	14472

Annexure 1: Average Daily Traffic - TVC 07 Cherthala

Day Wise Both Direction Traffic Data at TVC 07 Cherthala

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/26/2019	3867	347	96	1	183	10	173	57	9	10912	2021	618	238	151	53	0	1	17676	1061	18737	0	18737	14720
9/27/2019	3704	558	80	2	189	14	138	58	0	13212	1994	644	270	112	81	2	2	19949	1111	21060	0	21060	15866
9/28/2019	4120	432	93	0	279	6	44	24	0	13402	2016	724	246	97	59	0	3	20416	1129	21545	0	21545	16095
ADT (Ernakulam-Kottayam)	1887	192	43	0	98	3	69	25	1	6186	999	350	116	71	42	0	1	9503	580	10083	0	10083	7717
ADT (Kottayam-Ernakulam)	2010	253	47	1	119	7	49	22	2	6323	1011	312	135	49	22	0	1	9844	519	10363	0	10363	7838
AADT (Ernakulam-Kottayam)	1873	190	42	0	98	3	68	25	1	6106	986	345	114	70	41	0	1	9392	571	9963	0	9963	7628
AADT (Kottayam-Ernakulam)	1995	250	46	1	119	7	48	22	2	6241	998	308	133	48	22	0	1	9729	512	10241	0	10241	7752

Annexure 1: Average Daily Traffic - TVC 08 Udayamperoor

Day Wise Both Direction Traffic Data at TVC 08 Udayamperoor

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/15/2019	14744	1135	461	30	754	129	50	39	0	12972	2119	650	189	57	80	0	0	32433	976	33409	0	33409	29588
9/16/2019	8911	841	238	39	837	75	29	109	0	18120	2265	1240	533	302	183	2	0	31464	2260	33724	0	33724	28316
9/17/2019	7888	371	208	41	800	33	80	104	0	17263	2109	1284	557	279	249	1	2	28897	2372	31269	0	31269	26420
ADT (Ernakulam-Kottayam)	5029	374	144	17	403	37	23	39	0	7686	1086	480	223	92	87	0	0	14838	882	15720	0	15720	13529
ADT (Kottayam-Ernakulam)	5486	409	158	19	394	42	30	45	0	8432	1078	578	203	121	84	1	0	16093	987	17080	0	17080	14577
AADT (Ernakulam-Kottayam)	4992	369	142	17	403	37	23	38	0	7586	1072	474	220	91	86	0	0	14679	871	15550	0	15550	13400
AADT (Kottayam-Ernakulam)	5445	404	156	19	394	41	30	44	0	8322	1064	570	200	119	83	1	0	15919	973	16892	0	16892	14431

Annexure 1: Average Daily Traffic - TVC 09 Kumbalam Toll Plaza

Day Wise Both Direction Traffic Data at TVC 09 Kumbalam Toll Plaza

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/26/2019	16373	1081	383	52	620	178	413	218	3	26689	2237	2886	2768	1559	1681	2	9	48247	8905	57152	0	57152	57064
9/27/2019	17459	1397	487	29	889	103	431	163	0	26672	2223	3051	2916	1762	1772	4	3	49853	9508	59361	0	59361	60463
9/28/2019	18668	1817	527	51	547	81	648	122	0	27317	2446	2797	2188	1766	1552	0	3	52224	8306	60530	0	60530	59919
ADT (Ernakulam-Kottayam)	9015	680	223	23	317	56	269	85	1	13173	1127	1408	1394	873	878	1	4	24969	4558	29527	0	29527	29960
ADT (Kottayam-Ernakulam)	8485	751	243	21	368	64	229	83	0	13720	1175	1503	1230	823	791	1	1	25139	4349	29488	0	29488	29192
AADT (Ernakulam-Kottayam)	8948	671	220	23	317	55	266	84	1	13002	1112	1390	1376	862	867	1	4	24699	4500	29199	0	29199	29638
AADT (Kottayam-Ernakulam)	8422	741	240	21	368	63	226	82	0	13542	1160	1483	1214	812	781	1	1	24865	4292	29157	0	29157	28875

Annexure 1: Average Daily Traffic - TVC 10 Kumaranallor M C Road

Day Wise Both Direction Traffic Data at TVC 10 Kumaranallor M C Road

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/15/2019	21662	988	403	30	787	225	1256	37	26	11436	2951	164	1107	258	235	0	1	39801	1765	41566	0	41566	42612
9/16/2019	18380	943	261	54	905	155	1395	154	22	17267	3699	285	2409	576	663	0	0	43235	3933	47168	0	47168	48481
9/17/2019	17058	805	209	24	873	105	1423	145	78	18671	3379	238	2552	732	659	1	0	42770	4182	46952	0	46952	47850
ADT (Kochi-Kottayam)	9450	421	146	20	426	87	677	53	23	7740	1628	109	969	228	242	0	0	20671	1548	22219	0	22219	22702
ADT (Kottayam-Kochi)	9583	491	145	16	429	75	681	59	19	8051	1715	120	1054	294	277	0	0	21264	1745	23009	0	23009	23610
AADT (Kochi-Kottayam)	9380	416	144	20	426	86	668	52	23	7639	1607	108	956	225	239	0	0	20461	1528	21989	0	21989	22478
AADT (Kottayam-Kochi)	9512	485	143	16	429	74	672	58	19	7946	1693	118	1040	290	273	0	0	21047	1721	22768	0	22768	23371

Annexure 1: Average Daily Traffic - TVC 11 Palliyekkara Toll Plaza

Day Wise Both Direction Traffic Data at TVC 11 Palliyekkara Toll Plaza

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/26/2019	23837	2286	458	109	1351	153	1120	178	75	26788	3631	688	8053	2169	3546	1	15	59986	14472	74458	0	74458	87830
9/27/2019	25170	2076	538	115	1323	180	1241	167	84	27994	3493	665	8051	2149	3676	0	16	62381	14557	76938	0	76938	90425
9/28/2019	29922	2458	795	74	1347	317	1207	97	105	28775	3565	658	7405	1849	2942	4	0	68662	12858	81520	0	81520	91390
ADT (Thrissur-Ernakulam)	13139	1162	288	46	659	102	645	74	46	13961	1792	340	3906	972	1678	0	5	31914	6901	38815	0	38815	44799
ADT (Ernakulam-Thrissur)	13171	1111	309	53	681	115	544	74	42	13891	1771	330	3930	1083	1710	1	5	31762	7059	38821	0	38821	45074
AADT (Thrissur-Ernakulam)	13041	1147	284	46	659	101	637	73	45	13780	1769	336	3855	959	1656	0	5	31582	6811	38393	0	38393	44317
AADT (Ernakulam-Thrissur)	13073	1097	305	53	681	114	537	73	41	13710	1748	326	3879	1069	1688	1	5	31432	6968	38400	0	38400	44593

Annexure 1: Average Daily Traffic - TVC 12 Moothakunnam

Day Wise Both Direction Traffic Data at TVC 12 Moothakunnam

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/15/2019	16118	1666	683	5	372	109	495	34	13	16770	2064	229	1096	310	308	0	0	38329	1943	40272	0	40272	36480
9/16/2019	9446	1280	231	9	298	45	629	109	12	18035	1676	357	2204	535	544	3	0	31770	3643	35413	0	35413	32638
9/17/2019	8493	1205	186	19	315	22	595	123	17	18476	1521	333	2174	569	558	0	0	30972	3634	34606	0	34606	31637
ADT (Thrissur-Ernakulam)	5473	676	172	4	165	22	288	45	6	8716	873	157	894	223	235	1	0	16440	1510	17950	0	17950	16390
ADT (Ernakulam-Thrissur)	5880	708	195	7	163	37	285	44	8	9044	881	149	931	249	235	0	0	17252	1564	18816	0	18816	17200
AADT (Thrissur-Ernakulam)	5432	667	170	4	165	22	284	44	6	8603	862	155	882	220	232	1	0	16259	1490	17749	0	17749	16213
AADT (Ernakulam-Thrissur)	5836	699	192	7	163	37	281	43	8	8926	870	147	919	246	232	0	0	17062	1544	18606	0	18606	17016

Annexure 1: Average Daily Traffic - TVC 13 Gurupandapuri

Day Wise Both Direction Traffic Data at TVC 13 Gurupandapuri

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/29/2019	3103	332	178	1	193	11	128	29	0	5617	1341	360	158	250	255	3	0	10933	1026	11959	0	11959	11402
9/30/2019	2366	315	171	1	82	11	214	133	0	7241	2092	614	285	351	335	2	0	12626	1587	14213	0	14213	13385
10/1/2019	2328	391	162	2	248	5	54	108	0	6721	1840	590	302	306	403	8	0	11859	1609	13468	0	13468	13062
ADT (Tirur/Thiruvathra-Thrissur/Chavakkad)	1438	186	83	1	88	6	65	46	0	3242	858	272	140	156	185	2	0	6013	755	6768	0	6768	6568
ADT (Thrissur/Chavakkad-Tirur/Thiruvathra)	1161	160	87	1	86	3	67	44	0	3284	900	249	108	146	146	2	0	5793	651	6444	0	6444	6046
AADT (Tirur/Thiruvathra-Thrissur/Chavakkad)	1427	184	82	1	88	6	64	45	0	3200	847	268	138	154	183	2	0	5944	745	6689	0	6689	6495
AADT (Thrissur/Chavakkad-Tirur/Thiruvathra)	1152	158	86	1	86	3	66	43	0	3241	888	246	107	144	144	2	0	5724	643	6367	0	6367	5976

Annexure 1: Average Daily Traffic - TVC 14 Edappal

Day Wise Both Direction Traffic Data at TVC 14 Edappal

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/15/2019	16573	765	638	17	351	94	856	40	28	14428	3124	158	997	49	23	1	0	36914	1228	38142	0	38142	34640
9/16/2019	11093	700	342	33	303	69	856	112	13	19359	4058	353	1898	67	37	0	1	36938	2356	39294	0	39294	33606
9/17/2019	9930	631	227	22	300	22	919	112	40	18935	3807	345	2249	48	33	0	0	34945	2675	37620	0	37620	32264
ADT (Tirur-Thrissur)	6610	317	217	17	167	39	447	47	14	8820	1816	147	945	33	15	0	0	18511	1140	19651	0	19651	17332
ADT (Thrissur-Tirur)	5922	382	185	7	151	22	430	41	13	8754	1847	138	770	22	16	0	0	17754	946	18700	0	18700	16167
AADT (Tirur-Thrissur)	6561	313	214	17	167	38	441	46	14	8705	1792	145	933	33	15	0	0	18308	1126	19434	0	19434	17151
AADT (Thrissur-Tirur)	5878	377	183	7	151	22	424	40	13	8640	1823	136	760	22	16	0	0	17558	934	18492	0	18492	15998

Annexure 1: Average Daily Traffic - TVC 15 Cheruvannur

Day Wise Both Direction Traffic Data at TVC 15 Cheruvannur

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/15/2019	12182	487	147	26	715	131	1384	20	21	18470	2776	333	971	402	157	0	0	36359	1863	38222	0	38222	35464
9/16/2019	10214	556	119	10	640	101	1561	72	29	24762	3280	858	2589	648	270	0	0	41344	4365	45709	0	45709	41641
9/17/2019	9272	612	98	8	654	73	1522	78	26	24356	3212	889	2795	706	249	0	0	39911	4639	44550	0	44550	40707
ADT (Tirur-Kojhikode)	5187	298	61	5	340	52	742	29	14	11447	1530	345	1086	292	127	0	0	19705	1850	21555	0	21555	19754
ADT (Kojhikode-Tirur)	5369	254	60	9	330	50	747	28	11	11082	1559	349	1032	294	98	0	0	19499	1773	21272	0	21272	19516
AADT (Tirur-Kojhikode)	5149	294	60	5	340	51	732	29	14	11298	1510	341	1072	288	125	0	0	19482	1826	21308	0	21308	19537
AADT (Kojhikode-Tirur)	5329	251	59	9	330	49	737	28	11	10938	1539	344	1019	290	97	0	0	19280	1750	21030	0	21030	19306

Annexure 1: Average Daily Traffic - TVC 16 Azhinjillam

Day Wise Both Direction Traffic Data at TVC 16 Azhinjillam

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
9/29/2019	22759	878	448	22	32	68	371	20	65	16586	1807	211	2458	738	1283	1	0	43056	4691	47747	0	47747	48003
9/30/2019	20322	1094	289	32	50	44	271	76	105	21041	2158	440	4688	1206	1550	2	0	45482	7886	53368	0	53368	54222
10/1/2019	20360	1040	246	28	44	86	318	58	136	20836	2030	449	4776	1230	1698	3	0	45182	8156	53338	0	53338	55098
ADT (Kozhikode-Tirur)	10522	471	166	16	22	32	150	24	51	9667	997	183	1960	515	763	2	0	22118	3423	25541	0	25541	26032
ADT (Tirur-Kozhikode)	10625	533	162	11	20	34	170	27	51	9821	1002	184	2014	543	747	0	0	22456	3488	25944	0	25944	26408
AADT (Kozhikode-Tirur)	10444	465	164	16	22	32	148	24	50	9541	984	181	1935	508	753	2	0	21890	3379	25269	0	25269	25755
AADT (Tirur-Kozhikode)	10546	526	160	11	20	34	168	27	50	9693	989	182	1988	536	737	0	0	22224	3443	25667	0	25667	26126

Annexure 1: Average Daily Traffic - TVC 17 Muzhapilangad

Day Wise Both Direction Traffic Data at TVC 17 Muzhapilangad

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
10/3/2019	8355	536	230	15	176	47	719	119	11	9979	2387	436	2622	962	1097	2	5	22574	5124	27698	0	27698	31918
10/4/2019	9113	450	226	4	196	49	768	100	46	9859	2379	400	3024	989	1017	2	0	23190	5432	28622	0	28622	33038
10/5/2019	9621	572	219	6	171	71	761	90	48	10025	2589	418	2887	1273	1034	1	0	24173	5613	29786	0	29786	34654
ADT (Kannur-Kozhikode)	4419	308	111	3	97	24	365	55	21	5013	1236	211	1433	551	513	0	1	11652	2709	14361	0	14361	16575
ADT (Kozhikode-Kannur)	4611	211	114	5	84	32	385	48	14	4941	1215	207	1412	524	536	2	1	11660	2682	14342	0	14342	16633
AADT (Kannur-Kozhikode)	4386	304	110	3	97	24	360	54	21	4948	1220	208	1414	544	506	0	1	11527	2673	14200	0	14200	16388
AADT (Kozhikode-Kannur)	4577	208	113	5	84	32	380	47	14	4877	1199	204	1394	517	529	2	1	11536	2647	14183	0	14183	16448

Annexure 1: Average Daily Traffic - TVC 18 Knhagad South

Day Wise Both Direction Traffic Data at TVC 18 Knhagad South

Day	CAR-JEEP	TAXI	MINI-BUS	KSRTC BUS AC	KSRTC BUS NON AC	PVT BUS AC	PVT BUS NON AC	SCHOOL BUS	OTHERS	2W	PASS AUTO	GOODS AUTO	LCV	TRUCK	MULTI AXLE	TRACTOR+T	OTHERS GOODS	Passenger Vehicles	Freight Vehicles	Total Fast Moving Vehicles	Total Slow Moving Vehicles	Total Vehicles	Total PCU
10/3/2019	8335	481	146	4	350	23	614	93	66	8146	2084	151	1861	889	1212	1	0	20342	4114	24456	0	24456	29571
10/4/2019	8253	465	154	5	326	33	643	90	56	8154	2203	186	1991	913	1180	1	0	20382	4271	24653	0	24653	29779
10/5/2019	9351	375	153	9	347	71	627	48	21	8569	2248	193	1973	888	1157	0	1	21819	4212	26031	0	26031	30813
ADT (Kasaragod-Kannur)	4398	237	77	3	174	21	303	39	21	4217	1108	92	1002	474	574	0	0	10598	2142	12740	0	12740	15192
ADT (Kannur-Kasaragod)	4248	203	74	3	167	22	325	38	27	4073	1070	84	939	423	609	1	0	10250	2056	12306	0	12306	14864
AADT (Kasaragod-Kannur)	4365	234	76	3	174	21	299	38	21	4162	1094	91	989	468	567	0	0	10487	2115	12602	0	12602	15029
AADT (Kannur-Kasaragod)	4216	200	73	3	167	22	321	38	27	4020	1056	83	927	418	601	1	0	10143	2030	12173	0	12173	14705

Annexure 2.0 – 2.5: OD Matrixes

The Annexures are attached with this report in excel format. These annexures contain the OD Matrixes.

The details of the annexures are as follows:

Road Side Interview OD Matrixes	Annexures 2.0	All Passengers and All Goods Matrixes
Airport Analysis Details	Annexures 2.1	Kannur Airport
		Kochi Airport Terminal 1 & 3
		Kozhikode Airport
		Thiruvananthapuram Airport
		Combined Airport
Bus Stand Analysis Details	Annexures 2.2	Ernakulam Bus Stand
		Kozhikode Bus Stand
		Trissur Bus Stand
		Thiruvananthapuram Bus Stand
		Combined Bus Stand
Railway Station Analysis Details	Annexures 2.3	Ernakulam Railway Station
		Kollam Railway Station
		Kozhikode Railway Station
		Thiruvananthapuram Railway Station
		Combined Railway Station
Willingness to Shift to SHSR - Operator Survey	Annexures 2.4	Freight Forward Agency
		Truck Operator
Stated Preference and Willingness to pay results – On Board Survey	Annexures 2.5	Airport On Board Survey
		Bus On Board Survey
		Train On Board Survey
		Combined On Board Survey

Additional Survey Report for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

APRIL 2020

M/s. PK Engineers

Office Address: A-21, Rajgarh Road, PilanI, Jhunjhunu,
Rajasthan Pin-333031

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CHAPTER 1: INTRODUCTION

1.1 Background

As per GO (Ms) No. 52/2016/Trans dated 05/08/2016 and GO (Ms) No. 57/2016/Trans dated 01.09.2016 a Joint Venture Agreement between Government of Kerala and Ministry of Railways, Government of India for the Infrastructure Development of Railways in Kerala on 51:49 Equity Participation was signed on 1st September 2016 at New Delhi.

The Joint Venture Company would undertake Project development works for an identified basket of Projects, which will inter-alia include surveys, preparation of Detailed Project Report (DPR) and getting requisite approvals, processing for sanctioning of identified Projects and implementation of the sanctioned Project. Once the Project is sanctioned, the Land Acquisition will be done by the State Government and Project implementation by the Project Special Purpose Vehicle (SPV) in consultation with Ministry of Railways. The KERALA RAIL DEVELOPMENT CORPORATION LIMITED was incorporated on 03rd January 2017 with Ministry of Corporate Affairs and the Certificate of Incorporation Number (CIN) of the Company is U63030KL2017SGC047699.

The present study of preparation of Detailed Project Report for “Trivandrum to Kasaragod Semi-High Speed Rail Corridor” starts from Trivandrum in Trivandrum district and ends at Kasargod in Kannur district with a length of 565 km.

M/s. PK Engineers has been awarded this project to conduct the four types of Additional Surveys for the Traffic & Transportation Study in the state of Kerala.

1.2 Objective and Scope

The Additional Surveys are required to be carried out for the preparation of Detailed Project Report for the construction of Semi High Speed Rail Corridor between Thiruvananthapuram and Kasaragod, being undertaken by Kerala Rail Development Corporation Limited (KRDCL), Thiruvananthapuram.

Sr. No.	Survey Type	Work Details
1	Survey for Aggregator Services	This survey will be organised near all the proposed 26 Aggregator Stations. The Survey will be conducted at the bus and rail terminals near proposed Aggregator Stations and collect the information related to their trip including their last mile connectivity and willingness to use SHSR Aggregator Services. Proposed Aggregator Station Locations : Attingal, Kallambalam, Chathannur, Kundara/ Kottarakkara, Bharanikavu, Charummodu/ Mamoodu, Pandalam, Eraviperoor, Karukachal, Ettumanoor, Piravam, Chottanikara/Thrippunithura, Aluva, Nedumbassery Airport, Divine Nagar/ Chalakudy, Irinjalakkuda, Sobha City, Kunnamkulam, Edappal, Parappanangadi, Feroke, Koyilandy, Vadakara, Thalassery, Payyannur, Kanhangad.
2	Survey for Feasibility of	This survey will be conducted during day time and should mainly

Sr. No.	Survey Type	Work Details
	Restaurant Cars	cover the train passengers travelling by AC Classes. The willingness of the passengers to shift to SHSR and use of Restaurant Cars is to be collected. The survey will be carried out at selected Train Stations including Thiruvananthapuram Railway Station, Kollam Railway Junction, Ernakulam South Railway Station, Kozhikode Railway Station and Kannur Railway Station.
3	Survey for Feasibility of Sleeper Trains in Night	The survey will be target the passengers travelling under reservation during the night time both by AC buses and Trains (mostly travelling by 1 AC/ 2 AC/ 3 AC). The details related to the present trip of the passenger and their willingness to shift to Semi High Speed Sleeper Trains. The survey will be carried out at selected Bus Terminal / Train Stations including Thiruvananthapuram KSRTC Bus Terminal, Thiruvananthapuram Railway Station, Kollam Railway Junction, Ernakulam South Railway Station, Ernakulam – Vytila Bus Terminal, Thrissur KSRTC Bus Terminal, Kozhikode Railway Station and Kannur Railway Station. The survey should cover both bus and rail passengers travelling during night time.
4	Survey for Feasibility of Tourist Trains	The details related to the present trip of the tourists and their willingness to shift to Semi High Speed Rail Tourist Train will be collected through this survey. The important information will be collected include places visited (in the sequence), landing point, total cost of the Tour Package. The survey needs to be carried out at selected tourist spots including Kochi City (Marine drive), Trivandrum City (Near Padmanabha Swamy Temple, Kovalam Beach, Varkala Beach, Fort Kochi (Chinese Fishing Net), Alappuzha House Boat Location (Near Finishing Point) and Hotels (Major Tourist Hotels in Ernakulam, Trivandrum and Alappuzha). This is an important survey to be conducted through well-trained Surveyors, under supervision of Traffic Engineer. The survey should cover more foreign tourists in comparison to domestic tourists and therefore Surveyor should possess good communication skills in English.

1.3 Structure of this Report

The formation of the report is discussed as below:

Chapter 1: Introduction
Chapter covers the background of Project Road, objective and scope of services and structure of this project Report.

Chapter 2: Additional Survey and Analysis
This chapter covers the Surveys and analysis related to the project.

1.4 Compliance & Comments

Comments received on Traffic report from Systra/KRDCL and our compliance

Pending Deliverables and Observation on Additional Surveys:

The pending deliverables from Additional Surveys Part I – Feasibility of operating Aggregator Trains and Tourist Trains and Part II – feasibility of operating sleeper trains and restaurant car are as follows: -

Clarification is also sought on the following for all the 4 different surveys: -

1) The unit of travel time provided is in Minutes or Hours?-
   Ans :- Unit of Travel time is in Hours
2) There are many blank cells in the punched data – Reasons for the same.
   Ans:- If any passenger not willing to SHSR, then last two coloumn will remains the blank , otherwise it would occupied .
3) There are codes punched which are not provided in the format. Any code used while punching which are outside the pre-decided one to be detailed out.
   Ans:- Some extra code , we had inserted which not mentioned in the survey formats .
   1. In mode – we had provided the code -6 for General Train
   2. In Access mode - we had provided the code -7 for Train
4) In tourist survey format, the contact details of 95% of the samples are missing.
   Ans:- Out of 938 passengers we had recorded 274 passengers contact details , we tried our level best at site to catch the contact details for maximum passengers , But some passengers not ready to give their personal information .

CHAPTER 2 ADDITIONAL SURVEY AND ANALYSIS

2.0 Additional Survey and Analysis

2.1 Survey Details

The Survey schedule is shown in table 2.1 below:

- Aggregator Services (minimum sample required = 1800)
- Feasibility of Restaurant Car Survey (minimum sample required = 1000)
- Feasibility of Sleeper Trains (minimum sample required = 1000)
- Feasibility of Tourist Trains (minimum sample required = 900) -

Table2.1: Traffic Survey Schedule

Sr. No.	Survey Type	Start Date	End Date
1	Aggregator Services	19/12/2019	30/12/2019
2	Restaurant Car Survey	07/01/2020	12/01/2020
3	Sleeper Trains	07/01/2020	17/01/2020
4	Tourist Trains	17/12/2019	26/12/2019

The final characteristics have been presented in the following sections:

- Trip Purpose
- Travel Cost
- Frequency of Travel
- Willingness to Shift
- Willingness to Pay
- Factors for shifting to SHSR
- Stated Preference and Willingness to pay results
- Suggestion for Proposed SHSR, etc.

2.2 Sample Size Collected

The results are tabulated in **Table 2.2, 2.3 and 2.4.**

Table2.2: Sample size collected in Aggregator Services Survey

Location Number	Location Name	Boarding	Alighting	Total
1	Kazhakkuttom	88	64	152
2	Attingal Bus Stand	66	67	133
3	Kalambalam Bus Stop	72	49	121
4	Chathanoor Bus Stand	75	75	150
5	Kotarakara Bus Stand	56	68	124

Location Number	Location Name	Boarding	Alighting	Total
6	Bharanikau Bus Stand	45	50	95
7	Cherumodu Bus Stand	69	67	136
8	Pandalam Bus Stand	69	69	138
9	Eraviperoor Bus Stand	69	71	140
10	Karukachal Bus Stand	39	40	79
11	Ettamanur Bus Stand	38	40	78
12	Pirovam Bus Stand	37	38	75
13	Chottanikkar Bus Stand	40	42	82
14	Aluva Bus Stand	75	69	144
15	Nedumbassery Airport Bus Stand	53	57	110
16	Challakadi KSRTC Bus Stand	47	57	104
17	Irinjalakuda Bus Stand	54	57	111
18	Sobha City Bus Stand	58	60	118
19	Kunnamkulam Bus Stand	68	70	138
20	Wddapal Bus Stand	63	58	121
21	Parappanangadi Bus Stand	70	70	140
22	Ferok Bus Stand	75	72	147
23	Quailandy Bus Stand	80	66	146
24	Vadakara Bus Stand	66	67	133
25	Thallasara Railway Station	78	63	141
26	Payyanur Bus Stand	60	69	129
27	Kanhagad Bus Stand	70	70	140
Total		**1680**	**1645**	**3325**

Table2.3: Sample size collected in Restaurant Car and Sleeper Trains Survey (On selected Railway Station and Bus Stand)

Location Number	Location Name	Restaurant Car	Sleeper Train	Total
1	Changanoor		89	89
2	Ernakullam KSRTC Bus Stand	120	90	210
3	Ernakullam South Railway Station	120	70	190
4	Ernakullam Town Railway Station	60	60	120
5	Kanoor Rly Station	110	100	210
6	Kasargode Rly Station		50	50
7	Kollam Rly Station	140	150	290
8	Kozhikode KSRTC Bus Stand	50	50	100
9	Kozhikode Rly Station	150	150	300
10	Trivandram Central Rly Station	180	180	360
11	Trivandram Pvt. Volvo Stand	120	100	220
12	Vytilla Volvo Stand		80	80
Total		**1050**	**1169**	**2219**

Table2.4: Sample size collected in Tourist Trains Survey

S.No.	Location Name	Sample	
1	**Alapuzha Boat House**		**311**
1.a	Alapuzha Beach	268	
1.b	Alapuzha Beach Hotel	43	
2	**Kochi**		**296**
2.a	Marindrive Beach	108	
2.b	Marindrive Beach Hotel	45	
2.c	Fort Kochi Beach	128	
2.d	Fort Kochi Beach Hotel	15	
3	**Tourist Trains Trivandrum**		**331**
3.a	Varkala Beach	44	
3.b	Varkala Beach Hotel	30	
3.c	Kovalam Beach	99	
3.d	Kovalam Beach Hotel	30	
3.e	Padmnabh Swami Temple	108	
3.f	Padmnabh Swami Temple Hotel	20	
Total		**938**	**938**

2.3 Traffic Zoning System

To understand the spatial dimensions of the trip characteristics, detailed zoning system was developed giving due consideration to the following factors:

- The road network catering to the traffic on the project road and its generating points
- Important towns, villages, factories and industrial centres around the project road area.
- Administrative boundaries of districts and states.
- Configuration of the project road in the regional road network with respect to other roads

Two major types of areas were identified for analysis purpose:-

Immediate Influence Area (IIA): Immediate Influence Area includes the cities/towns/villages and districts along the project road and adjacent to it which generates/attracts trips to the project road. In this study it consists of districts within Kerala.

Broad Influence Area (BIA): Broad Influence Area includes the rest of Pondicherry, Tamil Nadu, Karnataka and the rest of India.

Detailed zoning system is prepared for IIA, while more aggregate or broad zoning is developed for BIA. The zoning system adopted for data collection is based on 196 zones and is presented.

The list of traffic zones is presented below in **Table 2.5** below.

Table2.5: List of Zones

Zone Code	Zone Name	District	State/UT
1	Manjeshwar	Kasaragod	Kerala
2	Kasaragod (Town)	Kasaragod	
3	Uduma	Kasaragod	

Zone Code	Zone Name	District	State/UT
4	Kanhangad	Kasaragod	
5	Trikaripur	Kasaragod	
6	Payyanur	Kasaragod	
7	Kasargod (Rest of Dist.)	Kasaragod	
8	Taliparamba	Kannur	
9	Kalliasseri	Kannur	
10	Azhikode	Kannur	
11	Kannur (City)	Kannur	
12	Thottada	Kannur	
13	Edakkad	Kannur	
14	Dharmadam	Kannur	
15	Thalassery	Kannur	
16	Kadirur	Kannur	
17	Kuthuparamba	Kannur	
18	Kannur International Airport/Mattannur	Kannur	
19	Iritty	Kannur	
20	Peravoor	Kannur	
21	Kannur (Rest of Dist.)	Kannur	
22	Mahe	Mahe	Puducherry
23	Nadapuram	Kozhikode	Kerala
24	Vadakara	Kozhikode	
25	Perambra	Kozhikode	
26	Quilandy	Kozhikode	
27	Elathur	Kozhikode	
28	Kozhikode(City)	Kozhikode	
29	Beypore	Kozhikode	
30	Thenhipalam	Kozhikode	
31	Thamarassery	Kozhikode	
32	Thiruvambadi	Kozhikode	
33	Kozhikode (Rest of Dist.)	Kozhikode	
34	Kalpetta	Wayanad	
35	Sulthan Bathery	Wayanad	
36	Mananthavady	Wayanad	
37	Wayanad (Rest of Dist.)	Wayanad	
38	Parappanangadi	Malappuram	
39	Tirurangadi	Malappuram	
40	Vengara	Malappuram	
41	Tanur	Malappuram	
42	Kottakkal	Malapuram	
43	Tirur	Malapuram	
44	Thavanur	Malapuram	
45	Kuttipuram	Malapuram	
46	Edappal	Malapuram	
47	Ponnani	Malapuram	
48	Calicut International Airport/Karipur/ Kondotty	Malapuram	
49	Areekode	Malapuram	
50	Edavanna	Malapuram	

Zone Code	Zone Name	District	State/UT
51	Nilambur	Malapuram	
52	Manjeri	Malapuram	
53	Ernad	Malapuram	
54	Malappuram (City)	Malappuram	
55	Mankada	Malappuram	
56	Perinthalmanna	Malappuram	
57	Malappuram (Rest of Dist.)	Malappuram	
58	Thrithala	Palakkad	
59	Pattambi	Palakkad	
60	Shornur	Palakkad	
61	Ottapalam	Palakkad	
62	Vadakkancherry	Palakkad	
63	Palakkad (Rest of Dist.)	Palakkad	
64	Kunnamkulam	Thrissur	
65	Chelakkara	Thrissur	
66	Guruvayoor	Thrissur	
67	Thrissur (City.)	Thrissur	
68	Ollur	Thrissur	
69	Nattika/ Triparayar	Thrissur	
70	Puthukkad	Thrissur	
71	Kaipamangalam	Thrissur	
72	Irinjalakuda	Thrissur	
73	Chalakudy	Thrissur	
74	Kodungallur	Thrissur	
75	Thrissur (Rest of Dist.)	Thrissur	
76	Cochin International Airport/Angamaly	Ernakulam	
77	North Paravoor	Ernakulam	
78	Aluva	Ernakulam	
79	Kunnathunad	Ernakulam	
80	Kochi	Ernakulam	
81	Thrippunithura	Ernakulam	
82	Perumbavoor	Ernakulam	
83	Kothamangalam	Ernakulam	
84	Muvattupuzha	Ernakulam	
85	Piravom	Ernakulam	
86	Koothattukulam	Ernakulam	
87	Ernakulam (Rest of Dist.)	Ernakulam	
88	Thodupuzha	Idukki	
89	Idukki (Rest of Dist.)	Idukki	
90	Aroor	Alappuzha	
91	Cherthala	Alappuzha	
92	Mararikulam	Alappuzha	
93	Alappuzha (City)	Alappuzha	
94	Ambalapuzha	Alappuzha	
95	Kuttanad	Alappuzha	
96	Haripad	Alappuzha	
97	Chengannur	Alappuzha	
98	Mavelikkara	Alappuzha	

Zone Code	Zone Name	District	State/UT
99	Kayamkulam	Alappuzha	
100	Alappuzha (Rest of Dist.)	Alappuzha	
101	Thalayolaparambu	Kottayam	
102	Vaikom	Kottayam	
103	Kaduthuruthy	Kottayam	
104	Pala	Kottayam	
105	Ettumanoor	Kottayam	
106	Kottayam (City)	Kottayam	
107	Puthuppally	Kottayam	
108	Pampady	Kottayam	
109	Kanjirappally	Kottayam	
110	Changanassery	Kottayam	
111	Kottayam (Rest of Dist.)	Kottayam	
112	Thiruvalla	Pathanamthitta	
113	Mallappally	Pathanamthitta	
114	Aranmula	Pathanamthitta	
115	Pandalam	Pathanamthitta	
116	Adoor	Pathanamthitta	
117	Ranni	Pathanamthitta	
118	Pathanamthitta (City)	Pathanamthitta	
119	Konni	Pathanamthitta	
120	Chittar	Pathanamthitta	
121	Sabarimala	Pathanamthitta	
122	Gavi	Pathanamthitta	
123	Pathanamthitta (Rest of Dist.)	Pathanamthitta	
124	Karunagappally	Kollam	
125	Chavara	Kollam	
126	Sasthamkotta	Kollam	
127	Kollam (City.)	Kollam	
128	Kundara	Kollam	
129	Kottarakkara	Kollam	
130	Chathannoor	Kollam	
131	Pathanapuram	Kollam	
132	Punalur	Kollam	
133	Chadayamangalam	Kollam	
134	Parippally	Kollam	
135	Kollam (Rest of Dist.)	Kollam	
136	Varkala	Thiruvananthapuram	
137	Attingal	Thiruvananthapuram	
138	Kilimanoor	Thiruvananthapuram	
139	Vamanapuram	Thiruvananthapuram	
140	Chirayinkeezhu	Thiruvananthapuram	
141	Venjaramoodu	Thiruvananthapuram	
142	Nedumangad	Thiruvananthapuram	
143	Thiruvananthapuram (City)	Thiruvananthapuram	
144	Trivandrum International Airport	Thiruvananthapuram	
145	Aruvikkara	Thiruvananthapuram	
146	Kattakkada	Thiruvananthapuram	

Zone Code	Zone Name	District	State/UT
147	Kovalam	Thiruvananthapuram	
148	Neyyattinkara	Thiruvananthapuram	
149	Thiruvananthapuram (Rest of Dist.)	Thiruvananthapuram	
150	Dharmapuri	North TN	Tamilnadu
151	Tiruvannamalai	North TN	
152	Vellore	North TN	
153	Kanchipuram	North TN	
154	Chennai	North TN	
155	Ooty	North TN	
156	Coimbatore	North TN	
157	Erode	North TN	
158	Salem	North TN	
159	Pollachi	North TN	
160	Rest of North TN	Tiruvallur,Krishnagiri,Villupuram, Cuddalore, Nilgiris, Tiruppur	
161	Karaikal	Karaikal	Puducherry
162	Karur	North central TN	Tamilnadu
163	Pudukkotai	North central TN	
164	Thiruchirapalli	North central TN	
165	Thanjavur	North central TN	
166	Kumbakonam	North central TN	
167	Rest of North central TN	Namakkal, Peramballur, Ariyalur, Nagapattinam, Thiruvarur	
168	Theni	South central TN	
169	Madurai	South central TN	
170	Karaikkudi	South central TN	
171	Madurai	South central TN	
172	Dindigul	South central TN	
173	Palani	South central TN	
174	Sivakasi	South central TN	
175	Rameshwaram	South central TN	
176	Rest of South central TN	Sivaganga, Ramanathapuram, Virudhunagar	
177	Nagercoil	South TN	
178	Thirunelveli	South TN	
179	Thoothukudi	South TN	
180	Rest of South TN	Kanyakumari, Tirunelveli, Thoothukudi	
181	Mangalore	Dakshina Kannada	Karnataka
182	Rest of Coastal Karnataka	Dakshina Kannada, Udupi, Uttar Kannada	
183	Mysore	South Karnataka	
184	Madikeri	South Karnataka	
185	Bengaluru	South Karnataka	
186	Hassan	South Karnataka	
187	Tumakuru	South Karnataka	
188	Chikmagalur	South Karnataka	
189	Shivamogga	South Karnataka	

Zone Code	Zone Name	District	State/UT
190	Davanagere	South Karnataka	
191	Rest of South Karnataka	Chamarajanagar, Chikkaballapur, Chitradurga, Kodagu, Kolar, Mandya,Ramanagara.	
192	Bellari	North Karnataka	
193	Hubli	North Karnataka	
194	Belgaum	North Karnataka	
195	Rest of North Karnataka	Vijayapura, Bagalkot, Bidar, Gulbarga, Yadagiri, Raichur, Gadag, Dharwad, Haveri and Koppal districts.	
196	Rest of India		

2.2.1. Development of Origin-Destination Matrices

The O-D matrices from the survey data were developed along the project corridor as given in the Annexures are attached with this report.

2.4 Aggregator Survey

The Aggregator survey was conducted near all the proposed 26 Aggregator Stations (bus and rail terminals). The information has been collected like trip information including their last mile connectivity and willingness to use of SHSR Aggregator Services at all the survey locations. The summarised result details are presented in the subsections.

2.4.1. Willingness to Shift to Proposed SHSR

The results are tabulated in **Table 2.6.** Only 17% of all passengers are expecting the proposed facility than the present system.

Table2.6: Willingness to Shift to Proposed SHSR (%)

Journey type	Total (No.)	Yes	No
Boarding	1680	19%	81%
Alighting	1645	15%	85%
Combined	3325	17%	83%

2.4.2. Willingness to Pay

The opinion of the users in terms of willingness to pay extra amount for the new facility if they opt, has been taken along with the other information at all the survey locations. The results are tabulated in **Table 2.7.** It is concluded from the analysis that 44% of passengers are ready to opt for the facility at the same cost and 38% of all the passengers are ready to opt for the facility at the rate of 1.25 times for their present cost of travel. If the new facility cost is three times to their present journey cost, nobody is ready to accept the new facility.

Table2.7: Willingness to pay results (%)

Journey type	Total (No.)	Same	1.25 times	1.5 times	2 times	3 times	4 times	5 times	>5 times
Boarding	1680	45%	38%	12%	5%	0%	0%	0%	0%
Alighting	1645	44%	38%	15%	4%	0%	0%	0%	0%
Combined	3325	44%	38%	13%	4%	0%	0%	0%	0%

2.4.3. Willingness to Shift to Proposed SHSR Feeder Service

The results are tabulated in **Table 2.8.** 41% of all passengers are ready to use the feeder service of the proposed facility.

Table2.8: Willingness to Shift to Proposed SHSR Feeder Service (%)

Journey type	Total (No.)	Yes	No
Boarding	1680	41%	59%
Alighting	1645	40%	60%
Combined	3325	41%	59%

2.4.4. Trip Purpose

An analysis was also carried out to assess the purpose of passenger's trips. **Table 2.9** summarises the purpose-wise trip characteristics of the passengers at all locations.

Table2.9: Purpose wise Trips (%)

Purpose	Work	Business	Education	Social	Recreation	Religious	Others
Boarding	35%	16%	16%	10%	3%	5%	16%
Alighting	38%	17%	15%	14%	1%	5%	8%
Combined	37%	17%	16%	12%	2%	5%	12%

- The work and business trips are more than 53 per cent.
- The social and tourist trips are (14 per cent) observed all locations.

2.4.5. Travel Frequency Analysis

An analysis was also carried out to assess the travel frequency of all vehicle modes. **Table 2.10** summarises the travel frequency at all locations.

- Occasionally Trip found to be having travel frequency of about 4 per cent and 23 per cent monthly.

Table2.10: Travel Frequency Analysis (%)

Frequency	Daily	Weekly	Monthly	Occasionally
Boarding	38%	30%	27%	5%
Alighting	43%	34%	20%	3%
Combined	40%	32%	23%	4%

2.4.6. Travel Mode

An analysis was also carried out to assess the travel mode trips. Non-AC Bus share found more than 78% share w.r.t. other modes.

Table2.11: Travel Mode Analysis (%)

Travel Mode	AC Train	Chair Car	Train Sleeper	AC Bus	Non AC Bus	General Train
Boarding	0%	5%	12%	3%	78%	1%
Alighting	0%	3%	10%	6%	78%	3%
Combined	0%	4%	11%	5%	78%	2%

2.4.7. Travel Mode - Access Mode/Dispersal Mode

An analysis was also carried out to assess the travel mode trips. City Bus share found more than 48% share w.r.t. other modes.

Table2.12: Travel Mode Analysis - Access Mode/Dispersal Mode (%)

Travel Mode	Walk	Auto	Car	Two Wheeler	Taxi	City Bus	Train
Boarding	18%	10%	4%	7%	3%	51%	7%
Alighting	24%	12%	5%	8%	5%	44%	1%
Combined	21%	11%	4%	8%	4%	48%	4%

2.4.8. Trip Length

An analysis was also carried out to assess the trip length of passenger trips. The details of trip length distribution are presented in the table below.

Table2.13: Trip Length (Km) Distribution (%)

Trip Length	0 – 20	21 - 50	51 - 100	101 - 250	251 - 500	501 - 1000	> 1000
Boarding	42%	30%	12%	12%	3%	1%	0%
Alighting	40%	31%	14%	12%	2%	0%	0%
Combined	41%	31%	13%	12%	3%	0%	0%

2.4.9. Travel Cost

An analysis was also carried out to assess the travel cost of passenger trips. The details of travel cost distribution are presented in the table below.

- The 72% of the trips are paying less than Rs. 50/- to reach the travel mode facility.

Table2.14: Travel Cost Analysis (%)

Travel Cost	>= 50	50 to 100	100 to 200	200 to 500	500 to 1000	1000 to 5000	< 5000
Boarding	73%	13%	9%	4%	1%	0%	0%
Alighting	72%	16%	8%	3%	0%	0%	0%
Combined	72%	14%	9%	4%	1%	0%	0%

2.4.10.Travel Time

There are 42% of the total trips has less than 30 minutes travel time to access the Travel Mode.

Table2.15: Travel Time (%)

Travel Time	<30 min	30-60 min	1-2 hrs	2-3 hrs	3-4 hrs	4-5 hrs	5-6 hrs	6-7 hrs	7-8 hrs	8-9 hrs	>9 hrs
Boarding	40%	27%	16%	6%	4%	2%	2%	1%	1%	0%	1%
Alighting	43%	27%	15%	6%	4%	2%	2%	1%	0%	0%	1%
Combined	42%	27%	15%	6%	4%	2%	2%	1%	1%	0%	1%

2.4.11. Waiting Time at Bus Station / Railway Stations

The result is presented below in **Table 2.16**.

Table2.16: Waiting Time at Bus Station / Railway Stations (%)

Waiting Time	<10 min	10-20 min	20-30 min	30-40 min	40-50 min	50-60 min	>60 min
Boarding	58%	24%	9%	2%	2%	2%	3%
Alighting	61%	20%	11%	4%	1%	1%	1%
Combined	60%	22%	10%	3%	1%	2%	2%

2.5 Restaurant Car Survey

The Restaurant Car survey was conducted near all the proposed 9 Surveys points which includes bus and rail terminals. The information has been collected like trip information including the source of food and willingness to use of SHSR Aggregator Services at all the survey locations. The summarized result details are presented in the subsections.

2.5.1. Willingness to Shift to Proposed SHSR

The results are tabulated in the Table below. 64% of all the passengers are expecting to use the proposed facility than the present system.

Table2.17: Willingness to Shift to Proposed SHSR (%)

Journey type	Yes	No
Restaurant Car User	64%	36%

2.5.2. Willingness to Pay

The opinion of the users in terms of willingness to pay extra amount for the new facility if they opt, has been taken along with the other information at all the survey locations. It is concluded from the analysis that 34% of passengers are ready to opt for the facility at the same cost and 28% of all the passengers are ready to opt for the facility at the rate of 1.25 times for their present cost of travel. If the new facility cost is four times to their present journey cost, nobody is ready to accept the new facility.

Table2.18: Willingness to Shift to Pay survey results (%)

Journey type	Same	1.25 times	1.5 times	2 times	3 time	4 times	5 times	>5 times
Restaurant Car User	34%	28%	17%	9%	8%	2%	0%	0%

2.5.3. Willingness to Shift to Proposed SHSR Sleeper Train at Night

The results are tabulated in **Table 2.19.** 37% of all passengers are ready to use the SHSR service at night.

Table2.19: Willingness to Shift to SHSR Sleeper Train at Night (%)

Journey type	Yes	No
Restaurant Car User	37%	63%

2.5.4. Trip Purpose

An analysis was also carried out to assess the purpose of passenger's trips. **Table 2.20** summarises the purpose-wise trip characteristics of the passengers at all locations.

Table2.20: Purpose wise Trips (%)

Journey type	Work	Business	Education	Social	Tourism	Religious	Others
Restaurant Car User	30%	20%	14%	14%	5%	4%	14%

- ~50% of the trips are under Work and Business Buckets
- ~20% of the trips were under social and tourism purpose

2.5.5. Travel Frequency Analysis

An analysis was also carried out to assess the travel frequency of all vehicle modes. **Table 2.21** summarises the travel frequency at all locations.

- Daily Trip is found to be having travel frequency of about 5 per cent and 50 per cent monthly.

Table2.21: Travel Frequency Analysis (%)

Journey type	Total No of Pass	Daily	Weekly	Monthly	Occasionally
Restaurant Car User	1050	5%	27%	50%	18%

2.5.6. Travel Mode

An analysis was also carried out to assess the travel mode of trips. AC Train share found 47% with respect to other modes.

Table2.22: Mode wise Trips (%)

Journey type	AC Train	Chair Car	Train Sleeper	AC Bus	Non-AC Bus	General Train
Restaurant Car User	47%	5%	16%	11%	21%	0%

2.5.7. Travel Time

There are 22% of the total trips has more than 9 Hours of travel time to reach their destination.

Table2.23: Travel Time (%)

Journey type	30-60 min	1-2 hrs	2-3 hrs	3-4 hrs	4-5 hrs	5-6 hrs	6-7 hrs	7-8 hrs	8-9 hrs	>9 hrs
Restaurant Car User	3%	10%	13%	11%	13%	12%	5%	5%	5%	22%

2.5.8. Distribution of Trips based on Resident of Kerala

The result is presented below in **Table 2.24**.

Table2.24: Residents of Kerala (%)

Journey type	Total No. of Pass	Yes	No
Restaurant Car User	1050	91%	9%

- 91% of trips are from Residents of Kerala

2.5.9. Source of Food during Journey

The result is presented below in Table 2.25.

Table2.25: Source of Food during Journey (%)

Journey type	No food is taken	Brought from home	Bought from WSA	Railway Catering onboard	bus meals stoppage points
Restaurant Car User	29%	17%	22%	15%	17%

- 29% of the passengers did not buy any food
- Only 15% of the passengers bought food from catering services on board

2.6 Feasibility of Sleeper Trains

The Trains survey was conducted near all the proposed 9 Surveys points which includes bus and rail terminals. The information has been collected like trip information including the source of food and willingness to use of SHSR Aggregator Services at all the survey locations. The summarized result details are presented in the subsections.

2.6.1. Willingness to Shift to Proposed SHSR

The results are tabulated in Table 2.26. More than 53% of all the passengers have expressed their willingness to use the proposed facility than the present system.

Table2.26: Willingness to Shift to Proposed SHSR (%)

Journey type	Total No of Pass	Yes	No
Sleeper Trains User	1169	53%	47%

2.6.2. Willingness to Pay

The opinion of the users in terms of willingness to pay extra amount for the new facility if they opt, has been taken along with the other information at all the survey locations. The results are tabulated in Table 2.27. It is concluded from the analysis that only 19% of passengers are ready to opt for the facility at the same cost and 37% of all the passengers are ready to opt for the facility at the rate of 1.25 times for their present cost of travel. If the new facility cost is four times to their present journey cost, 5% of users are ready to accept the new facility.

Table2.27: Willingness to Shift to Pay survey results (%)

Journey type	Same	1.25 times	1.5 times	2 times	3 time	4 times	5 times	>5 times
Sleeper Trains User	19%	37%	15%	9%	15%	5%	1%	0%

2.6.3. Willingness to Shift to Proposed SHSR Sleeper Train at Night

The results are tabulated in **Table 2.28.** 43% of all passengers are ready to use the SHSR service at night.

Table2.28: Willingness to Shift to SHSR Sleeper Train at Night (%)

Journey type	Yes	No
Sleeper Trains User	43%	57%

2.6.4. Trip Purpose

An analysis was also carried out to assess the purpose of passenger’s trips. **Table 2.19** summarises the purpose-wise trip characteristics of the passengers at all locations.

Table2.29 Purpose wise Trips (%)

Journey type	Work	Business	Education	Social	Tourism	Religious	Others
Sleeper Trains User	31%	18%	18%	13%	4%	7%	9%

- 51% of the trips are under Work and Business Buckets
- 17% of the trips were under social and tourism purpose

2.6.5. Travel Frequency Analysis

An analysis was also carried out to assess the travel frequency of all vehicle modes. **Table 2.30** summarises the travel frequency at all locations.

- Daily Trip is found to be having travel frequency of less than 3 per cent and 53 per cent monthly.

Table2.30: Travel Frequency Analysis (%)

Journey type	Total No of Pass	Daily	Weekly	Monthly	Occasionally
Sleeper Trains User	1169	3%	23%	53%	21%

2.6.6. Travel Mode

An analysis was also carried out to assess the travel mode of trips. AC Train share found more than share (i.e. 44%) with respect to other modes.

Table2.31: Mode wise Trips (%)

Journey type	Total No of Pass	AC Train	Chair Car	Train Sleeper	AC Bus	Non-AC Bus	General Train
Sleeper Trains User	1169	44%	1%	23%	19%	12%	0%

2.6.7. Travel Time

There are 37% of the total trips has more than 9 Hours travel time to reach their destination.

Table2.32: Travel Time (%)

Journey type	Total No of Pass	30-60 min	1-2 hrs	2-3 hrs	3-4 hrs	4-5 hrs	5-6 hrs	6-7 hrs	7-8 hrs	8-9 hrs	>9 hrs
Sleeper Trains User	1169	1%	5%	7%	7%	9%	9%	8%	8%	8%	37%

2.6.8. Distribution of Trips based on Resident of Kerala

The result is presented below in **Table 2.33**.

Table2.33: Residents of Kerala (%)

Journey type	Total No of Pass	Yes	No
Sleeper Trains User	1169	85%	15%

- 85% of trips are from Residents of Kerala.

2.6.9. Travel Cost

An analysis was also carried out to assess the travel cost of passenger trips. The details of travel cost distribution are presented in the table below.

Table2.34: Travel cost of Trips (%)

Journey type	Total No of Pass	>50	50 to 100	100 to 200	200 to 500	500 to 1000	1000 to 5000	< 5000
Sleeper Trains User	1169	2%	4%	10%	25%	39%	20%	0%

- The 41% of the trips are paying less than Rs. 500/- to reach the travel mode facility.

2.7 Feasibility of Tourist Trains

2.7.1. Willingness to Shift to Proposed SHSR

The results are tabulated in **Table 2.35**. More than 40% of all the passengers have expressed their willingness to use the proposed facility than the present system.

Table2.35: Willingness to Shift to Proposed SHSR (%)

Journey type	Total No of Pass	Likely	Can't Say	Not likely
Tourist Trains	938	45%	19%	36%

2.7.2. Willingness to Pay

The opinion of the users in terms of willingness to pay extra amount for the new facility if they opt, has been taken along with the other information at all the survey locations. The results are tabulated in Table 2.36. It is concluded from the analysis that only 22% of passengers are ready to opt for the facility at the same cost and 47% of all the passengers are ready to opt for the facility at the rate of 1.25 times for their present cost of travel. If the new facility cost is three times to their present journey cost, only 1% of passengers are ready to accept the new facility.

Table2.36: Willingness to Shift to Pay survey results (%)

Journey type	Same	1.25 times	1.5 times	2 times	3 time	4 times	5 times	>5 times
Tourist Trains	22%	47%	25%	5%	1%	0%	0%	0%

2.7.3. Distribution of Trips based on Resident of Kerala

The result is presented below in **Table 2.37**.

Table2.37: Residents of Kerala (%)

Journey type	Total No of Pass	Keralite	Non-Keralite	Foreigner
Tourist Trains	938	22%	42%	36%

- 36% of trips are Foreigners

2.7.4. Travel Cost

An analysis was also carried out to assess the cost of entire trip. The details of travel cost distribution are presented in the table below.

Table2.38: Cost of Trip (%)

Journey type	Total No of Pass	0-10000	10001-20000	20001-35000	35001-50000	50001-100000	>100000
Tourist Trains	938	15%	8%	11%	12%	23%	32%

- The 32% of the tourists are paying more than Rs. 1,00,000/-

2.7.5. Travel Frequency Analysis

An analysis was also carried out to assess the travel frequency of all vehicle modes. **Table 2.39** summarises the travel frequency at all locations.

- Monthly Trip is found to be having travel frequency of less than 5 per cent and 58 per cent yearly.

Table2.39: Travel Frequency Analysis (%)

Journey type	Total No of Pass	Monthly	Quarterly	Half Yearly	Yearly	Other
Tourist Trains	938	2%	5%	14%	58%	22%

2.7.6. Travel Mode

An analysis was also carried out to assess the travel mode of trips. Taxi share found more than share (i.e. 37%) with respect to other modes. AC Train is next preferred mode with percentage share of 21 Percent.

Table2.40: Mode wise Trips (%)

Journey type	Total No of Pass	AC Train	Chair Car	Train Sleeper	AC Bus	Non-AC Bus	CAR	Taxi	Other
Tourist Trains	938	21%	2%	7%	12%	4%	16%	37%	2%

2.7.7. Occupation

An analysis of tourist has been undertaken based on their occupation.

Table2.41: Occupation (%)

Journey type	Total No of Pass	Govt Service	Private Service	Business	Student	Housewife	Retired
Tourist Trains	938	9%	32%	42%	10%	2%	4%

- 32% tourists belong to private sector
- Tourist with business background were in higher number (i.e. 42%)

2.7.8. Type of Currency used during Trip

During survey, it has been observed that 87% of the tourist preferred Rupee as currency.

Table2.42: Currency used during trip (%)

Journey type	Total No of Pass	Rupee	Dollar	Euro	Other
Tourist Trains	938	87%	5%	8%	0%

- During survey, it has been observed that 87% of the tourist preferred Rupee as currency.

2.7.9. Trip based on Travel Package

As per the survey conducted, 91% of the tourist did not use any travel package.

Table2.43: Travel Package trips (%)

Journey type	Total No of Pass	Yes	No
Tourist Trains	938	9%	91%

2.7.10.Monthly Income

The result is presented below in Table 2.44.

Table2.44: Monthly income (%)

Journey type	<10000	10,001 to 20,000	20,001 to 35,000	35,001 to 50,000	50,001 to 1,00,000	>1,00,000
Tourist Trains	1%	3%	17%	24%	34%	20%

- 46% of the tourist has income less than Rs. 50,000

2.7.11.Number of Accompanies during Travel

It has been observed that 86% of tourists were accompanied by less than 5 persons.

Table2.45: Number of Accompanies (%)

Journey type	Total No of Pass	<5	6 to 15	16 to 40	>40
Tourist Trains	938	86%	12%	1%	1%

- There were a smaller number of group travelers (i.e. >16 persons)

2.7.12.Number of Days on Trip

Tourists usually prefer to spend 6 to 15 days (49%) on a trip.

Table2.46: Number of Days on Trip (%)

Journey type	Total No of Pass	<5	6 to 15	16 to 40	>40
Tourist Trains	938	39%	48	12%	1%

- 39% of tourists spent less than 5 days.

2.7.13. Tourist Visit Spots Ranking

Tourists usually prefer Kochi with 23% w.r.t. to other tourist places in the state of Kerala. The detailed rank list of Tourist Visited as per the surveys is presented in the **Table 2.47**.

Table2.47: Tourist Visit Spots Ranking (%)

Rank	Passenger %age	Zone Code	Zone Name
1	23.0%	80	Kochi City
2	18.2%	93	Alappuzha City
3	11.7%	143	Thiruvananthapuram City
4	10.1%	136	Varkala
5	7.3%	147	Kovalam
6	5.5%	61	Ottapalam
7	4.8%	127	Kollam City
8	3.5%	89	Idukki
9	3.5%	28	Kozhikode City
10	1.6%	180	Rest of South TN
11	1.6%	63	Palakkad
12	1.6%	106	Kottayam City
13	1.0%	87	Ernakulam
14	0.9%	67	Thrissur
15	0.7%	11	Kannur
16	0.6%	196	Rest of India
17	0.5%	72	Irinjalakuda
18	0.4%	185	Bengaluru
19	0.3%	54	Malappuram City
20	0.3%	2	Kasaragod Town
21	0.3%	64	Kunnamkulam
22	0.3%	118	Pathanamthitta City
23	0.2%	3	Uduma
24	0.2%	121	Sabarimala
25	0.2%	132	Punalur
26	0.1%	39	Tirurangadi
27	0.1%	56	Perinthalmanna
28	0.1%	129	Kottarakkara
29	0.1%	15	Thalassery
30	0.1%	47	Ponnani
31	0.1%	84	Muvattupuzha

Rank	Passenger %age	Zone Code	Zone Name
32	0.1%	92	Mararikulam
33	0.1%	37	Wayanad
34	0.1%	99	Kayamkulam
35	0.1%	104	Pala
36	0.1%	110	Changanassery
37	0.1%	137	Attingal
38	0.1%	155	Ooty
39	0.1%	178	Thirunelveli
40	0.0%	22	Mahe
41	0.0%	66	Guruvayoor
42	0.0%	73	Chalakudy
43	0.0%	78	Aluva
44	0.0%	88	Thodupuzha
45	0.0%	91	Cherthala
46	0.0%	108	Pampady
47	0.0%	109	Kanjirappally
48	0.0%	116	Adoor
49	0.0%	125	Chavara
50	0.0%	149	Thiruvananthapuram
51	0.0%	154	Chennai
52	0.0%	168	Theni
53	0.0%	169	Madurai
54	0.0%	173	Palani

Annexures

Annexure 2.1 – 2.3: OD Matrixes

The Annexures are attached with this report in excel format. These annexures contain the OD Matrixes.

The details of the annexures are as follows:

Aggregator Survey Matrix	Annexures 2.1	Aggregator Survey Matrix - Boarding Combined
		Aggregator Survey Matrix - Alighting Combined
		Aggregator Survey Matrix – Combined (Boarding & Alighting)
Feasibility of Restaurant Cars Matrix	Annexures 2.2	Restaurant Cars Matrix Combined
Feasibility of Sleeper Trains Matrix	Annexures 2.3	Sleeper Trains Matrix Combined

Aggregator Survey Matrix - Boarding Combined - Annexures 2.1

Boarding	Total	% trips
1	0	0%
2	6	0%
3	7	0%
4	47	3%
5	8	0%
6	62	4%
7	0	0%
8	1	0%
9	0	0%
10	0	0%
11	4	0%
12	0	0%
13	0	0%
14	0	0%
15	83	5%
16	0	0%
17	0	0%
18	0	0%
19	0	0%
20	10	1%
21	3	0%
22	4	0%
23	0	0%
24	68	4%
25	5	0%
26	70	4%
27	1	0%
28	16	1%
29	2	0%
30	0	0%
31	0	0%
32	0	0%
33	38	2%
34	0	0%
35	0	0%
36	0	0%
37	0	0%
38	50	3%
39	10	1%
40	4	0%
41	4	0%
42	7	0%
43	3	0%
44	0	0%
45	4	0%
46	13	1%
47	1	0%
48	0	0%
49	0	0%
50	1	0%
51	1	0%
52	7	0%
53	0	0%
54	9	1%
55	0	0%
56	3	0%
57	7	0%
58	0	0%
59	7	0%
60	3	0%
61	1	0%
62	1	0%
63	3	0%
64	32	2%
65	1	0%
66	10	1%
67	29	2%
68	0	0%
69	0	0%
70	0	0%
71	0	0%
72	42	3%
73	37	2%
74	2	0%
75	73	4%
76	51	3%
77	0	0%
78	77	5%
79	0	0%
80	1	0%
81	0	0%
82	3	0%
83	0	0%
84	11	1%
85	34	2%
86	1	0%
87	44	3%
88	0	0%
89	0	0%
90	0	0%
91	0	0%
92	0	0%
93	1	0%
94	0	0%
95	0	0%
96	1	0%
97	5	0%
98	57	3%
99	5	0%
100	2	0%
101	0	0%
102	0	0%
103	0	0%
104	0	0%
105	37	2%
106	6	0%
107	0	0%
108	3	0%
109	2	0%
110	6	0%
111	2	0%
112	55	3%
113	30	2%
114	0	0%
115	55	3%
116	6	0%
117	0	0%
118	8	0%
119	0	0%
120	1	0%
121	2	0%
122	0	0%
123	4	0%
124	2	0%
125	6	0%
126	36	2%
127	19	1%
128	11	1%
129	22	1%
130	27	2%
131	1	0%
132	2	0%
133	0	0%
134	6	0%
135	3	0%
136	8	0%
137	36	2%
138	63	4%
139	2	0%
140	1	0%
141	0	0%
142	4	0%
143	21	1%
144	0	0%
145	1	0%
146	1	0%
147	0	0%
148	1	0%
149	92	5%
150	0	0%
151	0	0%
152	0	0%
153	0	0%
154	1	0%
155	0	0%
156	0	0%
157	0	0%
158	0	0%
159	0	0%
160	0	0%
161	0	0%
162	0	0%
163	0	0%
164	0	0%
165	0	0%
166	1	0%
167	0	0%
168	0	0%
169	0	0%
170	0	0%
171	0	0%
172	0	0%
173	0	0%
174	0	0%
175	0	0%
176	0	0%
177	0	0%
178	0	0%
179	0	0%
180	0	0%
181	0	0%
182	0	0%
183	0	0%
184	0	0%
185	1	0%
186	0	0%
187	0	0%
188	0	0%
189	0	0%
190	0	0%
191	0	0%
192	0	0%
193	0	0%
194	0	0%
195	0	0%
196	0	0%
Total	1678	

Boarding	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Total	1	22	9	15	25	10	0	6	1	0	40	0	1	0	27	0	1	0	0	9	28	7	0	14	9	14	3	114	1	1	3	0	28	0	0	1	1	5	6	2	11	12	17	1	15	6	2	0	0

Boarding	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98
Total	0	4	3	0	14	0	1	9	0	10	12	1	5	25	1	1	15	85	0	0	0	0	4	9	6	40	10	0	17	0	10	0	5	2	7	8	0	112	6	10	0	5	0	20	1	0	5	22	28

Boarding	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147
Total	13	2	0	5	0	19	6	45	2	3	5	25	1	46	24	2	5	19	6	24	0	0	8	0	5	9	5	8	76	18	37	3	1	0	0	16	4	14	33	19	0	1	8	1	122	0	0	1	1

Boarding	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	Total
Total	1	29	0	0	0	0	4	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0	3	1	0	0	0	0	0	0	0	0	1	3	1678

Aggregator Survey Matrix - Alighting Combined - Annexures 2.1

Alighting	Total	% trips
1	0	0%
2	25	1%
3	12	1%
4	18	1%
5	28	2%
6	23	1%
7	1	0%
8	2	0%
9	0	0%
10	5	0%
11	45	3%
12	0	0%
13	1	0%
14	0	0%
15	31	2%
16	0	0%
17	9	1%
18	0	0%
19	3	0%
20	4	0%
21	4	0%
22	13	1%
23	2	0%
24	28	2%
25	13	1%
26	22	1%
27	1	0%
28	75	4%
29	0	0%
30	0	0%
31	0	0%
32	0	0%
33	37	2%
34	0	0%
35	2	0%
36	1	0%
37	2	0%
38	4	0%
39	5	0%
40	4	0%
41	4	0%
42	14	1%
43	17	1%
44	0	0%
45	12	1%
46	7	0%
47	2	0%
48	0	0%
49	0	0%
50	0	0%
51	5	0%
52	3	0%
53	0	0%
54	25	1%
55	0	0%
56	3	0%
57	16	1%
58	0	0%
59	8	0%
60	4	0%
61	4	0%
62	9	1%
63	35	2%
64	3	0%
65	1	0%
66	14	1%
67	89	5%
68	0	0%
69	0	0%
70	0	0%
71	1	0%
72	6	0%
73	12	1%
74	2	0%
75	47	3%
76	11	1%
77	0	0%
78	22	1%
79	0	0%
80	13	1%
81	1	0%
82	7	0%
83	0	0%
84	21	1%
85	7	0%
86	1	0%
87	89	5%
88	2	0%
89	7	0%
90	0	0%
91	3	0%
92	0	0%
93	13	1%
94	1	0%
95	0	0%
96	8	0%
97	9	1%
98	8	0%
99	10	1%
100	0	0%
101	0	0%
102	2	0%
103	0	0%
104	22	1%
105	5	0%
106	69	4%
107	0	0%
108	1	0%
109	1	0%
110	21	1%
111	0	0%
112	46	3%
113	10	1%
114	18	1%
115	1	0%
116	25	1%
117	14	1%
118	25	1%
119	0	0%
120	0	0%
121	3	0%
122	0	0%
123	2	0%
124	26	2%
125	6	0%
126	11	1%
127	98	6%
128	6	0%
129	25	1%
130	2	0%
131	0	0%
132	0	0%
133	0	0%
134	14	1%
135	4	0%
136	27	2%
137	31	2%
138	11	1%
139	0	0%
140	4	0%
141	6	0%
142	2	0%
143	60	4%
144	0	0%
145	0	0%
146	1	0%
147	0	0%
148	4	0%
149	21	1%
150	0	0%
151	0	0%
152	0	0%
153	0	0%
154	4	0%
155	0	0%
156	3	0%
157	0	0%
158	0	0%
159	0	0%
160	0	0%
161	0	0%
162	0	0%
163	0	0%
164	1	0%
165	0	0%
166	0	0%
167	0	0%
168	0	0%
169	0	0%
170	0	0%
171	1	0%
172	0	0%
173	0	0%
174	0	0%
175	0	0%
176	2	0%
177	0	0%
178	0	0%
179	0	0%
180	0	0%
181	6	0%
182	0	0%
183	0	0%
184	0	0%
185	0	0%
186	0	0%
187	0	0%
188	0	0%
189	0	0%
190	0	0%
191	0	0%
192	0	0%
193	0	0%
194	2	0%
195	2	0%
196	4	0%
Total	1643	

Alighting	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Total	0	2	6	40	11	75	0	0	0	2	9	0	0	0	64	0	0	0	1	15	3	5	1	52	4

Alighting	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
Total	51	1	12	0	0	0	1	54	0	0	1	0	51	3	7	0	8	2	1	3	15	0	4	0	0

Alighting	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Total	0	0	0	4	1	3	5	0	2	1	0	5	9	41	0	9	23	0	0	2	0	56	46	0	67

Alighting	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Total	21	0	71	0	3	0	2	0	4	42	0	67	0	4	0	2	1	6	0	1	0	11	46	9	0

Alighting	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125
Total	0	0	0	1	37	29	1	10	1	4	0	68	23	0	39	11	0	4	0	1	1	0	0	1	2

Alighting	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
Total	38	31	11	52	18	0	0	0	6	6	10	42	6	1	1	0	7	34	0	1	0	0	1	72	0

Alighting	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173
Total	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Alighting	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	Total
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1643

Aggregator Survey Matrix - Combined (Boarding & Alighting) - Annexures 2.1

Alighting	Total	% trips
1	0	0%
2	31	2%
3	19	1%
4	65	4%
5	36	2%
6	85	5%
7	1	0%
8	3	0%
9	0	0%
10	5	0%
11	49	3%
12	0	0%
13	1	0%
14	0	0%
15	114	7%
16	0	0%
17	9	1%
18	0	0%
19	3	0%
20	14	1%
21	7	0%
22	17	1%
23	2	0%
24	96	6%
25	18	1%
26	92	5%
27	2	0%
28	91	5%
29	2	0%
30	0	0%
31	0	0%
32	0	0%
33	75	4%
34	0	0%
35	2	0%
36	1	0%
37	2	0%
38	54	3%
39	15	1%
40	8	0%
41	8	0%
42	21	1%
43	20	1%
44	0	0%
45	16	1%
46	20	1%
47	3	0%
48	0	0%
49	0	0%
50	1	0%
51	6	0%
52	10	1%
53	0	0%
54	34	2%
55	0	0%
56	6	0%
57	23	1%
58	0	0%
59	15	1%
60	7	0%
61	5	0%
62	10	1%
63	38	2%
64	35	2%
65	2	0%
66	24	1%
67	118	7%
68	0	0%
69	0	0%
70	0	0%
71	1	0%
72	48	3%
73	49	3%
74	4	0%
75	120	7%
76	62	4%
77	0	0%
78	99	6%
79	0	0%
80	14	1%
81	1	0%
82	10	1%
83	0	0%
84	32	2%
85	41	2%
86	2	0%
87	133	8%
88	2	0%
89	7	0%
90	0	0%
91	3	0%
92	0	0%
93	14	1%
94	1	0%
95	0	0%
96	9	1%
97	14	1%
98	65	4%
99	15	1%
100	2	0%
101	0	0%
102	2	0%
103	0	0%
104	22	1%
105	42	3%
106	75	4%
107	0	0%
108	4	0%
109	3	0%
110	27	2%
111	2	0%
112	101	6%
113	40	2%
114	18	1%
115	56	3%
116	31	2%
117	14	1%
118	33	2%
119	0	0%
120	1	0%
121	5	0%
122	0	0%
123	6	0%
124	28	2%
125	12	1%
126	47	3%
127	117	7%
128	17	1%
129	47	3%
130	29	2%
131	1	0%
132	2	0%
133	0	0%
134	20	1%
135	7	0%
136	35	2%
137	67	4%
138	74	4%
139	2	0%
140	5	0%
141	6	0%
142	6	0%
143	81	5%
144	0	0%
145	1	0%
146	2	0%
147	0	0%
148	5	0%
149	113	7%
150	0	0%
151	0	0%
152	0	0%
153	0	0%
154	5	0%
155	0	0%
156	3	0%
157	0	0%
158	0	0%
159	0	0%
160	0	0%
161	0	0%
162	0	0%
163	0	0%
164	1	0%
165	0	0%
166	1	0%
167	0	0%
168	0	0%
169	0	0%
170	0	0%
171	1	0%
172	0	0%
173	0	0%
174	0	0%
175	0	0%
176	2	0%
177	0	0%
178	0	0%
179	0	0%
180	0	0%
181	6	0%
182	0	0%
183	0	0%
184	0	0%
185	1	0%
186	0	0%
187	0	0%
188	0	0%
189	0	0%
190	0	0%
191	0	0%
192	0	0%
193	0	0%
194	0	0%
195	2	0%
196	4	0%

Alighting	Total
1	1
2	24
3	15
4	55
5	36
6	85
7	0
8	6
9	1
10	2
11	49
12	0
13	1
14	0
15	91
16	0
17	1
18	0
19	1
20	24
21	31
22	12
23	1
24	66
25	13
26	65
27	4
28	126
29	1
30	1
31	3
32	1
33	82
34	0
35	0
36	2
37	1
38	56
39	9
40	9
41	11
42	20
43	19
44	2
45	18
46	21
47	2
48	4
49	0
50	0
51	4
52	3
53	0
54	18
55	1
56	4
57	14
58	0
59	12
60	13
61	1
62	10
63	34
64	42
65	1
66	24
67	108
68	0
69	0
70	2
71	0
72	60
73	55
74	6
75	107
76	31
77	0
78	88
79	0
80	13
81	0
82	7
83	2
84	11
85	50
86	0
87	179
88	6
89	14
90	0
91	7
92	1
93	26
94	1
95	1
96	5
97	33
98	74
99	22
100	2
101	0
102	5
103	0
104	20
105	43
106	74
107	3
108	13
109	6
110	29
111	1
112	114
113	47
114	2
115	44
116	30
117	6
118	28
119	0
120	1
121	9
122	0
123	5
124	10
125	7
126	46
127	107
128	29
129	89
130	21
131	1
132	0
133	0
134	22
135	10
136	24
137	75
138	25
139	1
140	2
141	8
142	8
143	156
144	0
145	1
146	1
147	1
148	2
149	101
150	0
151	0
152	0
153	0
154	5
155	0
156	4
157	0
158	1
159	1
160	0
161	0
162	0
163	0
164	0
165	0
166	0
167	0
168	0
169	0
170	0
171	0
172	0
173	0
174	0
175	1
176	0
177	0
178	0
179	0
180	0
181	7
182	0
183	0
184	0
185	3
186	1
187	0
188	0
189	0
190	0
191	0
192	0
193	0
194	0
195	4
196	3
Total	3321

Restaurant Car Survey - All Location Combined - Annexures 2.2

Boarding	Total	% trips
1	0	0%
2	27	3%
3	0	0%
4	4	0%
5	0	0%
6	4	0%
7	0	0%
8	0	0%
9	0	0%
10	0	0%
11	61	6%
12	0	0%
13	0	0%
14	0	0%
15	3	0%
16	0	0%
17	0	0%
18	0	0%
19	0	0%
20	0	0%
21	0	0%
22	3	0%
23	0	0%
24	6	1%
25	2	0%
26	4	0%
27	2	0%
28	121	12%
29	0	0%
30	1	0%
31	1	0%
32	0	0%
33	16	2%
34	0	0%
35	4	0%
36	2	0%
37	16	2%
38	2	0%
39	1	0%
40	0	0%
41	0	0%
42	1	0%
43	15	1%
44	0	0%
45	2	0%
46	0	0%
47	0	0%
48	0	0%
49	0	0%
50	0	0%
51	0	0%
52	0	0%
53	0	0%
54	1	0%
55	0	0%
56	0	0%
57	0	0%
58	0	0%
59	1	0%
60	1	0%
61	0	0%
62	0	0%
63	5	0%
64	1	0%
65	0	0%
66	0	0%
67	15	1%
68	0	0%
69	0	0%
70	0	0%
71	0	0%
72	1	0%
73	2	0%
74	0	0%
75	0	0%
76	0	0%
77	0	0%
78	8	1%
79	0	0%
80	2	0%
81	0	0%
82	0	0%
83	0	0%
84	0	0%
85	0	0%
86	0	0%
87	237	23%
88	0	0%
89	0	0%
90	0	0%
91	0	0%
92	0	0%
93	5	0%
94	0	0%
95	0	0%
96	0	0%
97	3	0%
98	0	0%
99	2	0%
100	0	0%
101	0	0%
102	0	0%
103	0	0%
104	0	0%
105	0	0%
106	12	1%
107	0	0%
108	0	0%
109	0	0%
110	1	0%
111	0	0%
112	0	0%
113	0	0%
114	0	0%
115	0	0%
116	0	0%
117	0	0%
118	0	0%
119	0	0%
120	0	0%
121	0	0%
122	0	0%
123	0	0%
124	1	0%
125	0	0%
126	0	0%
127	66	6%
128	0	0%
129	0	0%
130	0	0%
131	0	0%
132	0	0%
133	0	0%
134	0	0%
135	0	0%
136	0	0%
137	0	0%
138	0	0%
139	0	0%
140	0	0%
141	0	0%
142	0	0%
143	328	31%
144	0	0%
145	0	0%
146	0	0%
147	0	0%
148	0	0%
149	0	0%
150	0	0%
151	0	0%
152	0	0%
153	0	0%
154	2	0%
155	0	0%
156	2	0%
157	0	0%
158	0	0%
159	0	0%
160	0	0%
161	0	0%
162	0	0%
163	0	0%
164	0	0%
165	0	0%
166	0	0%
167	0	0%
168	0	0%
169	3	0%
170	0	0%
171	0	0%
172	0	0%
173	0	0%
174	0	0%
175	0	0%
176	0	0%
177	5	0%
178	0	0%
179	0	0%
180	1	0%
181	20	2%
182	0	0%
183	1	0%
184	0	0%
185	8	1%
186	0	0%
187	0	0%
188	0	0%
189	0	0%
190	0	0%
191	0	0%
192	1	0%
193	0	0%
194	0	0%
195	0	0%
196	17	2%

Boarding	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	Total	% trips
Total	0	25	0	8	0	2	0	0	0	0	53	0	0	0	6	0	0	0	0	0	0	2	0	11	0	4	0	76	0	0	0	0	3	0	0	0	6	3	1	0	0	4	33	0	8	0	0	0	0	0	0	0	0	2	0	0	0	0	1	10	0	3	36	0	0	10	89	0	1	0	0	4	0	0	1	5	0	21	0	3	0	0	0	1	2	0	145	3	0	0	3	0	19	0	0	0	12	1	9	0	0	1	0	2	1	56	0	0	1	1	0	4	0	0	1	2	0	3	0	0	1	0	0	4	0	0	66	0	0	0	0	1	0	2	0	5	3	0	0	0	4	0	128	0	0	0	5	0	0	0	0	0	0	20	0	6	0	3	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	0	9	20	2	3	0	21	0	0	0	0	0	1	0	0	0	0	41	1050	

Sleeper Train Survey - All Location Combined - Annexures 2.3

Train Combined	Total	% trips
1	0	0%
2	54	5%
3	0	0%
4	6	1%
5	0	0%
6	3	0%
7	0	0%
8	0	0%
9	0	0%
10	1	0%
11	77	7%
12	0	0%
13	0	0%
14	0	0%
15	9	1%
16	0	0%
17	0	0%
18	1	0%
19	0	0%
20	0	0%
21	0	0%
22	3	0%
23	0	0%
24	11	1%
25	5	0%
26	3	0%
27	2	0%
28	132	11%
29	0	0%
30	0	0%
31	4	0%
32	0	0%
33	4	0%
34	0	0%
35	0	0%
36	0	0%
37	6	1%
38	0	0%
39	0	0%
40	0	0%
41	0	0%
42	0	0%
43	15	1%
44	0	0%
45	2	0%
46	0	0%
47	0	0%
48	0	0%
49	0	0%
50	0	0%
51	0	0%
52	0	0%
53	0	0%
54	0	0%
55	0	0%
56	0	0%
57	0	0%
58	0	0%
59	0	0%
60	7	1%
61	0	0%
62	0	0%
63	6	1%
64	0	0%
65	0	0%
66	0	0%
67	17	1%
68	0	0%
69	0	0%
70	0	0%
71	0	0%
72	0	0%
73	0	0%
74	0	0%
75	0	0%
76	6	1%
77	0	0%
78	3	0%
79	0	0%
80	1	0%
81	0	0%
82	0	0%
83	0	0%
84	0	0%
85	0	0%
86	0	0%
87	269	23%
88	0	0%
89	0	0%
90	0	0%
91	0	0%
92	0	0%
93	6	1%
94	1	0%
95	0	0%
96	0	0%
97	73	6%
98	0	0%
99	0	0%
100	0	0%
101	0	0%
102	0	0%
103	0	0%
104	0	0%
105	0	0%
106	5	0%
107	0	0%
108	0	0%
109	0	0%
110	0	0%
111	0	0%
112	0	0%
113	0	0%
114	0	0%
115	0	0%
116	1	0%
117	0	0%
118	0	0%
119	0	0%
120	0	0%
121	0	0%
122	0	0%
123	0	0%
124	0	0%
125	0	0%
126	0	0%
127	67	6%
128	0	0%
129	1	0%
130	0	0%
131	0	0%
132	0	0%
133	0	0%
134	0	0%
135	0	0%
136	0	0%
137	0	0%
138	0	0%
139	0	0%
140	0	0%
141	4	0%
142	0	0%
143	332	28%
144	0	0%
145	0	0%
146	0	0%
147	0	0%
148	0	0%
149	0	0%
150	0	0%
151	0	0%
152	0	0%
153	0	0%
154	4	0%
155	0	0%
156	2	0%
157	0	0%
158	0	0%
159	0	0%
160	0	0%
161	0	0%
162	0	0%
163	0	0%
164	0	0%
165	0	0%
166	0	0%
167	0	0%
168	0	0%
169	0	0%
170	0	0%
171	0	0%
172	0	0%
173	0	0%
174	0	0%
175	0	0%
176	0	0%
177	0	0%
178	0	0%
179	0	0%
180	1	0%
181	13	1%
182	1	0%
183	1	0%
184	0	0%
185	0	0%
186	0	0%
187	1	0%
188	0	0%
189	0	0%
190	0	0%
191	0	0%
192	2	0%
193	0	0%
194	0	0%
195	0	0%
196	7	1%
Total	1169	

Train Combined	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total	0	39	0	4	0	17	0	0	0	0	62	0	0	0	12	0	0	0	0	0

Train Combined	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Total	0	5	0	16	1	3	0	94	0	1	1	0	0	0	0	1	3	1	0	0

Train Combined	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Total	0	4	33	0	7	1	0	0	0	0	0	1	0	4	0	2	0	0	2	13

Train Combined	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Total	1	0	26	0	0	0	72	0	0	1	0	1	3	0	0	7	0	28	0	7

Train Combined	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Total	0	0	0	1	1	0	101	0	0	0	0	0	36	0	0	0	2	0	4	0

Train Combined	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Total	0	0	0	3	1	26	0	0	0	3	0	0	1	0	0	0	0	8	0	0

Train Combined	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
Total	10	0	0	4	0	1	53	1	0	0	0	0	0	0	0	0	2	0	0	0

Train Combined	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
Total	0	2	144	0	0	0	0	0	4	0	2	0	0	46	0	23	0	6	0	2

Train Combined	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
Total	0	0	0	0	1	0	0	0	12	0	2	0	0	0	0	0	4	2	0	3

Train Combined	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	Total
Total	37	1	4	0	79	0	1	0	0	0	1	0	0	0	4	58	1169

KERALA RAIL DEVELOPMENT CORPORATION LTD.
5th Floor, Trans Towers, Vazhuthacaud, Thycaud P.O.
Thiruvananthapuram, Kerala - 695 014
Phone: 0471-2324330, 2326330 Fax: 0471 2325330
krdclgok@gmail.com | www.keralarail.com, www.krdcl.co.in

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